SUCCESS WITH CUTTINGS

Chris & Valerie Wheeler

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Introduction

Growing your own plants is a very satisfying part of gardening, and it is particularly exciting to see a plant develop from a cutting that you have nurtured yourself. Being able to take the right kind of cutting at the appropriate time of year and give it suitable treatment to enable it to form its own roots is extremely rewarding. Cuttings can be taken to propagate a huge range of plants, including perennials and alpines, shrubs and trees, heathers and conifers, climbers, houseplants and fruit bushes.

Cuttings are taken from various parts of shoots and stems, but in certain cases from leaves and roots as well. This practical book shows you the basic techniques to enable you to produce results with many popular plants, and some more unusual ones. A range of methods is described in detail to encourage you to experiment and to increase the types of plants you can grow.

We have aimed this book at gardeners, of all abilities, who are keen to start growing their own plants from cuttings. Some may want to experiment with a wider, more challenging range of plants.

Simple techniques and easy-to-grow plants are included to encourage beginners to get started, while more involved methods and more challenging plants will inspire more experienced gardeners to attempt something different.

The book is split into two parts. The first part discusses the different types of cuttings and the reasons plants are propagated in this way, and goes on to describe the skills and facilities required for propagation.

The second part supplies details of a large number of different plants in various categories, explaining the most appropriate way of propagating each one vegetatively. You can look up a particular plant and see immediately what type of cuttings to use, when to take them and how to root them. Any specific information for that particular plant is also given.

It is very satisfying to raise a new, complete plant from a cutting you have taken yourself. The whole process – removing a piece of plant from its parent, encouraging new roots to form, and watching fresh growth appearing – is a most rewarding experience.

LEFT **Inserting a cutting in a pot of compost**

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CHAPTER 1

Why take cuttings?

A cutting is a part of a plant that can be taken and treated in such a way as to form roots, and thus become a separate plant. Propagating plants from cuttings is a way of increasing them vegetatively, in order to maintain their characteristics exactly. Cuttings may be taken from parts of the plant's stem, leaf and root; particular plants root more readily from certain parts than from others.

HOW DO CUTTINGS ROOT?

The 'vegetative' part of the plant that is removed as a cutting is generally capable of producing new roots either from the piece of cut tissue, or from the wound-healing tissue, or **callus**, that may be formed on the cut piece. Vegetative parts include stems, leaves and roots, as opposed to the reproductive parts such as flowers, seeds and fruits.

Plants have a layer of actively dividing cells, the **cambium**, just beneath their bark (outer layer). The cambium is capable of producing new tissues, allowing stems to thicken, and it is where new roots also most often develop. These new roots are called **adventitious roots**, meaning that they are added or artificial.

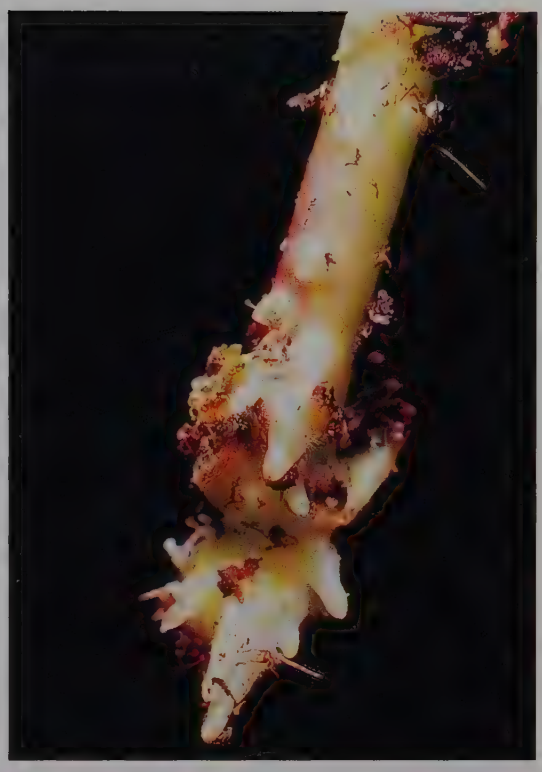
ROOT AND SHOOT DEVELOPMENT ON DIFFERENT TYPES OF CUTTINGS

- Stem cuttings (taken from any part of a plant stem) may form roots directly from the stem in this way, but many form a callus over the cut surface. The callus is a mass of protective tissue that may be formed in response to wounding. New roots form either through this from the base of the stem or, in some cases, directly from the callus itself.

LEFT **Each of these geranium (pelargonium) cuttings has been removed from one parent plant, and each is capable of forming roots and becoming a separate yet identical plant**

- In leaf cuttings, whether whole or cut, roots form near the veins; a new shoot system will also need to develop.
- Root cuttings need to develop both adventitious roots and shoots.

Vegetative propagation of plants is possible because plant cells contain all the genes essential for growth and development. Because of the way the chromosomes split, two identical cells are formed from the cell that is dividing, consequently the characteristics of any new plant developing from a severed part (that is, a cutting) will be the same as the original.



RIGHT **New (adventitious) roots emerging from around the base of a *Penstemon* cutting. They have been formed from the cambium, a layer of actively dividing cells just beneath the outer surface**

BELOW **Vegetative propagation allows desirable characteristics to be perpetuated. *Lewisia cotyledon* is variable when raised from seed, but specific flower colours or forms can be maintained by propagating from cuttings**

ABOVE **New roots grow from root initials formed beneath the stem surface and emerge from or near the base of the stem (this is a cutting of *Penstemon*)**

ABOVE **The fibrous roots on this fuchsia cutting have extended, and continued their growth and development by means of further active cell division**

Specific areas of a plant where active cell division occurs are the shoot tip, the root tip and the cambium, a layer of cells beneath the bark or outer layer. Many cells are capable of returning to the state in which they can regenerate and differentiate to produce a new root and/or shoot system. This ability is what makes vegetative propagation possible. Even mature plant parts have this potential, though as we shall see, age affects performance, and young plant material roots more readily.

Vegetative propagation means large numbers of individual plants identical to each other can be produced. In practical terms, a new plant can be bulked up relatively quickly, or several plants raised from just one parent plant. It allows desirable characteristics to be perpetuated readily, unlike seed-raised plants which can be widely variable because of the high number of genetic combinations.

Auxins

These are natural hormones and they play a large and important part in initiating adventitious root growth. Synthetic auxins, available to gardeners as rooting powder or liquid, are frequently used to supplement the plant's natural auxins, and are applied sparingly to the cut

ABOVE *Dianthus* 'Prince of Denmark' has been preserved over centuries by propagation from cuttings, ensuring that it is still true to form

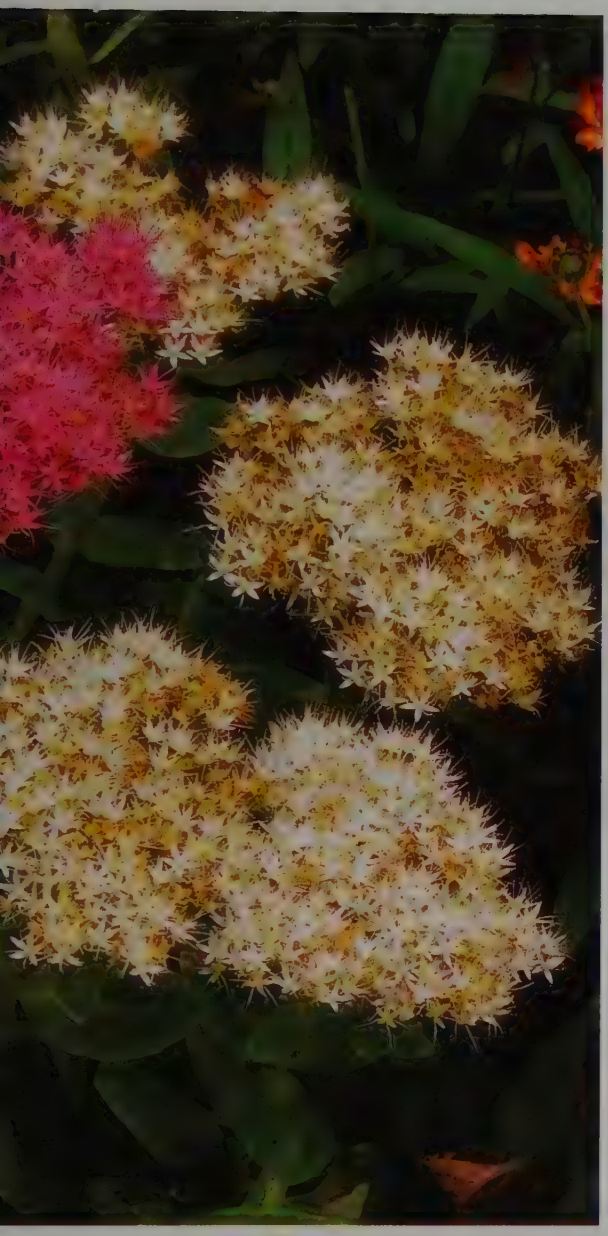
base of cuttings. However, auxins inhibit shoot growth, so you need to take great care using rooting hormones on leaf-bud cuttings or leaf cuttings so that shoot growth is not prevented. In many cases, they are not necessary.

The chapters on individual plants from cuttings give information on when not to use rooting hormones.

WHERE DO ROOTS DEVELOP ON CUTTINGS?

Stem cuttings

Adventitious root formation occurs when certain groups of cells become capable of active division and differentiation. Root initials are formed and with continuing division the new roots grow and emerge from or near the base of the stem.



LEFT **Plants taken from cuttings are identical to the parent, though very occasionally a hybrid may produce a shoot that reverts to the original. This white-flowered *Sedum* has thrown a pink-flowered shoot**

Some easily rooted plants, such as willow, hydrangea and poplar, have preformed root initials that are already present but are dormant in the stem. When such stems are taken as cuttings, the root initials grow out as roots, but are generally faster because the initial stage is already present.

In stem cuttings, only a new root system is required as the shoot system is already in place. This is true whether the main part of the cutting comprises the tip of a shoot, axillary buds at leaf nodes or just one bud in the case of a leaf-bud cutting (a piece of stem with a single bud).

Leaf cuttings

Mature cells become capable of division and differentiation, allowing new roots and shoots to develop from a leaf. In some cases, callus tissue forms on the cut surface and both root and shoot development occurs from the callus.

Adventitious roots are more easily formed on leaves than are adventitious buds, and in some cases you may find a rooted leaf just will not produce an adventitious shoot, although the rooted leaf may survive for some considerable time just as it is.

Root cuttings

These need to produce adventitious shoots and usually adventitious roots as well. Adventitious shoots usually develop near the cambium or from callus tissue. New roots can develop from dormant root initials in the root cutting, while adventitious roots may develop from around the cambium.

Some root cuttings produce a new shoot followed by new roots. These roots can be produced either from the root cutting itself or from the base of the new shoot. If a shoot grows first, you can remove it and treat it as a stem cutting instead. Sometimes, a shoot will develop, but no roots emerge, and after a while the shoot will die. In other cases, the root system develops before the shoots.

ABOVE ***Berberis* x *stenophylla* 'Corallina Compacta' is a dwarf evergreen shrub that can only be propagated by cuttings in order to retain the specific characteristics it was bred for**

WHY CUTTINGS ARE NECESSARY

Taking cuttings is the only guaranteed way to obtain identical plants to the parent plant. A cutting is a vegetative part of the plant so it will produce a new plant with identical characteristics and appearance to the plant it was taken from.

Cuttings nearly always come true to type; the exceptions are root cuttings of particular types of plant. These are **chimeras**, in which outer tissues contain a different genetic make-up to the inner tissues, and root cuttings of these may produce plants differing from the parent.

An example of this occurs in the case of root cuttings of some thornless cultivars of *Rubus*, which can produce plants of the thorny types.

However, to all intents and purposes, a cutting will produce a plant identical to the plant it was taken from. This is important in order that we are able to perpetuate exactly plant hybrids and cultivars and particularly good forms of plants. If raised from seed, these plants would undoubtedly vary considerably. Taking cuttings is the only way to propagate many variegated plants – raised from seed, a proportion of them are variegated but many revert to green.

Many highly bred plants are sterile and so do not set seed; this means that they can only be propagated vegetatively. Others may produce limited amounts of seed, or be very difficult to germinate.

Cuttings offer a way of increasing stock easily, cheaply and relatively quickly in many cases. A large number of plants can be raised

from just one or a few parent plants. The plants raised will be uniform, which is particularly advantageous for groups of plants or hedges.

Some plants are rather more challenging or difficult to propagate from cuttings, and if you want to try these it is well worth taking many more cuttings than you need (if the material is available), as the percentage that successfully root is likely to be lower.

WHAT MAKES A GOOD CUTTING?

As mentioned previously, many vegetative parts of a plant can be used as cuttings, though the suitability and rooting potential of these parts varies considerably between different plant species, and the time of the year. They also need to be treated in an appropriate way in order to maximize success in producing roots and subsequently a new plant.

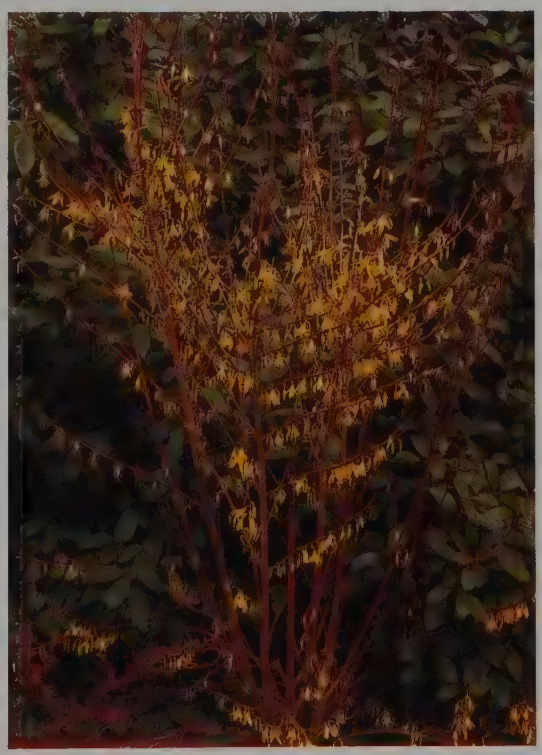
Cuttings may be taken from stems, leaves or roots. Plants can often be propagated by more than one type of cutting, though one method may be easier or more convenient than another. For instance, cuttings taken early in the year need more exacting conditions, more care and, ideally, heated equipment to succeed. Although many plants can be propagated at this time, it may be easier and cheaper for you to take another type of cutting later in the season. Another advantage of different types of cutting is that if early ones don't succeed, you can take more later on.

Some plants require a particular type of cutting to be taken because of certain inherent characteristics. The way they grow may determine the best type of cutting, or perhaps the kind of stem they have (for example, pithy, hollow or extremely thin), or they may dislike being disturbed in the ground (that is, having to be dug up in the case of locating material for root cuttings). There are many other reasons, and you will find several discussed in the individual plant sections.

QUALITY OF PLANT MATERIAL

The quality of a cutting is of utmost importance. It is no good expecting to raise a healthy new plant from a poor or spindly piece of material, or from a weakly growing plant. Similarly, diseased or crooked material is not going to make good cutting material. Select strongly growing, healthy material that is true to type, and free from pests and diseases. Young material tends to root far more readily than older material, as the tissues are more likely to still be actively developing.

- Shoots selected for cuttings should be strong and as straight as possible, with healthy leaves (in season) and preferably without flower buds, though these can be removed when preparing the cutting if necessary. Choose cuttings from actively growing parts of the plant, not thin



RIGHT ***Forsythia*** **'Golden Nugget' can be propagated from softwood, semi-hardwood or hardwood cuttings, and it is up to you to decide which method is most convenient for your circumstances**

ABOVE **Healthy cutting material is very important. The young, strongly growing shoots of this *Viburnum opulus* 'Nanum' are ideal**

spindly pieces from near the base or underneath.

- Leaves used as cuttings should be newly (but fully) opened, healthy and fresh-looking.
- Root cuttings need to be taken from strongly growing, firm roots. Remove any weak or softened parts. Use pencil-thick pieces where possible, although some herbaceous perennials will have only thin roots, and these are suitable.

If you only have a poor or old specimen plant from which to take cuttings – for instance, you want to renew a very old, neglected plant – then of course it is worth trying any material that is alive. The success rate is, however, likely to be much lower, and as far as possible you should aim to use young, healthy, strong plant material.

Effects of seasonal growth on rooting ability

As plant tissues develop continuously through the growing season, any distinction between the types of cutting based on maturity of wood is somewhat blurred, but there are general guidelines. Fast-growing new shoots emerging in spring will generally root more readily and quickly, often in two to three weeks. These softwood cuttings are normally taken in spring, but the shoots may still be soft enough to be treated as softwood cuttings in some plants even in summer. It is the state of the material that should guide you more than the time of year.

As shoots mature they root less readily, and take longer to root, often from four to six weeks up to a few months. They require less particular

conditions, and do not usually need heat provided. Being firmer, they wilt less easily and are less prone to rotting. The time of year they are taken varies from summer through to autumn, depending on the plant. Evergreens are taken later than deciduous shrubs.

Fully mature material can take several months to root, but is the least prone to problems. Cuttings of mature material are usually taken from late autumn through until late winter. Deciduous plants are propagated in this way once they have lost their leaves.

Flowering shoots are less likely to root than non-flowering ones, as the hormones that initiate flower buds suppress those that promote rooting. If you have to use cuttings with flowers – and sometimes it is impossible to find a non-flowering shoot at the best time for taking cuttings – then always remove both flowers and buds.

TYPES OF CUTTINGS

A cutting, therefore, is any part of a parent plant that can be removed and, given appropriate treatment and conditions, is able to develop into an individual plant in its own right. Cuttings are classified into stem, leaf or root cuttings.

STEM CUTTINGS

The majority of plants are propagated by stem cuttings, and this is certainly the most common way of producing shrubs. Stem cuttings are classified into three main groups, depending on the maturity of the stem tissue – softwood, semi-hardwood and hardwood. Stem cuttings can be taken both from the main shoot of a plant and from the side shoots. Some plants respond better to rooting from one type of stem cutting than another. The individual plant descriptions in later chapters will give you more details.

ABOVE **These fresh new basal shoots of *Sedum* produced in spring are ideal softwood cutting material**

Softwood

Softwood cuttings are usually taken from the tips of new shoots that are fully developed but not yet hardened or at all 'woody'. They may also be taken from the new basal shoots produced by herbaceous perennials.

Normally, both types of softwood cutting are taken in the spring once the new growth is sufficiently developed. Because the material is very soft, such cuttings can wilt quickly; they lose water through their leaves, and can dry out rapidly, so they must be dealt with both speedily and appropriately.

They must never be allowed to dry out, and need to be kept in humid conditions from the moment they are removed from the parent plant. If they are kept in a warm, humid environment, they will readily form roots.

Softwood cuttings can be used to propagate deciduous shrubs, many herbaceous plants and some houseplants.

Semi-hardwood

These are taken from firmer, semi-ripe stems and shoots. They are less likely to wilt and can be successfully rooted in a less supportive environment. Cuttings are taken from the current season's growth, either from side shoots or from the top of the main stem. Semi-hardwood cuttings are normally taken during summer and early autumn.

They are used for propagating deciduous and evergreen shrubs. Evergreens are more successful when grown from semi-hardwood rather than softwood cuttings as their leaf waxes will be well developed by this time of year, making the leaves less prone to losing water. Early in the year the fresh, new growth of evergreens is very prone to wilting.

ABOVE **These hardwood leaf-bud cuttings of *Vitis vinifera* 'Purpurea' are a specific type known as 'vine eye' cuttings. Taken once the leaves have fallen, they are wounded at the base by removing a sliver of wood to reveal the cambium and stimulate root development. Note the slanted cut at the top and straight cut at the base of the cuttings**

Hardwood

Hardwood cuttings are taken at the end of the growing season, and the material must be fully ripened, mature wood from the current season's growth. Deciduous plants are propagated from hardwood cuttings once they have lost their leaves; many evergreens can also be successfully propagated by this method. Hardwood cuttings can even be rooted outside, using a trench in the garden soil for large quantities. Use this propagation method for shrubs, trees and soft fruits.

Pipings

These are simply stem cuttings taken from the tips of pinks or carnations (*Dianthus*). They are slightly different as they are pulled away from the plant rather than cut. Simply hold on to the stem with one hand, and with the other hand pull the shoot tip away cleanly at a joint, or node. It will come away easily just above the joint. It is then inserted just as it is, without further trimming of the base.

Root cuttings

These are taken in the dormant season, using young roots that are strong and vigorous. They are usually taken at pencil-thickness, but thinner roots may be taken for some herbaceous plants. Cut the root into sections, making the cut nearest

ABOVE **A root cutting, showing a slanting cut at the end that was furthest from the crown of the parent plant**

the crown of the plant straight across and the cut at the base with a slant. This way, you can tell which way up the root is. It is important to insert the root sections the right way up (straight cut at the top) as roots always form at the end furthest from the crown of the plant (slanted cut end). Thicker roots are inserted vertically with the top straight end of the cutting just level with the surface of the compost.

The roots of plants with thin roots are cut into sections and laid horizontally in trays of compost, covering with a layer of compost.

Root cuttings of variegated hybrid plants frequently revert to all-over green, so it is best to propagate these by other means (stem cuttings).

Leaf cuttings

Whole leaves or parts of leaves can be used as cuttings for some plants, mainly houseplants.

A whole, completely developed leaf with a leaf stalk should be removed, and the leaf stalk inserted into compost with the leaf lying flat on the compost. Roots, and subsequently shoots, will develop at the base of the leaf.

ABOVE **Insert root cuttings so that the slanted cut end is pushed in first and the straight cut end is at the top**

In *Begonia rex*, a whole leaf is taken and cuts made at intervals in the large leaf veins on the back of the leaf. New plantlets form at the cuts when the leaf is pinned to the compost surface. In other houseplants, leaves may be cut into sections and inserted upright or laid flat. New roots and shoots develop from the cut edges.

Humidity and warmth are important for success in propagating new plants from leaf cuttings, and care must be taken that they don't become too wet. Keep a careful watch for signs of rotting and grey mould.

CHOOSING THE BEST METHOD

Selecting which type of cutting to use for a particular plant depends partly on suggested methods that are known to work best, and partly on your facilities and the time of year. The optimum time may not be convenient, but another time and type of cutting may be successful for you, even if it takes longer or is not the most preferred method.

Softwood cuttings are quick to root, but it is no good trying these if you have neither the time nor facilities to devote to them. Most plants can be propagated vegetatively from more than one type of cutting, at different times in their growing season, so do whatever is likely to be most successful for you.

CHAPTER 2

Types of cutting

Taking cuttings as a means of propagation is the most common way of increasing plants vegetatively (other forms include division and layering). The source of the cuttings – that is, the parent or stock plant – is of vital importance.

STOCK PLANTS

As we have already learnt, plants grown from cuttings are normally perfect copies of the plants from which the cuttings were taken. It is therefore important to ensure that the stock plant is true to type, and free from obvious signs of disease. Virus diseases in particular can be readily transmitted by cuttings, and any plants showing signs of virus should not be used for cuttings.

Plants will root less readily from cutting material that is more than 12 months old. In order to produce strong, healthy cuttings, stock plants must be managed to encourage them to produce vigorous new growth. On a commercial scale this is usually done by growing plants in designated stock beds, trimming them to produce new vegetative growth rather than flowers. In the garden the routine pruning and care of most plants will produce enough suitable cutting material.

If you intend to propagate an older plant that is no longer producing vigorous new growth, it is a good idea to prune at least part of it back early in the season and then feed and water it well to encourage new growth. To build up the numbers of a plant quickly, the tips of newly rooted cuttings can be used to make a further batch of cuttings. This technique is commonly used in commercial nurseries but it is also ideal if you can only get hold of one cutting initially and you want to produce several plants.

TIMING OF CUTTINGS

One of the most important factors in the successful rooting of any type of cutting is the time in the plant's growth cycle that the material is taken.

The main types of stem cutting – softwood, semi-hardwood and hardwood – are linked to the growth stages of the shoots. A softwood cutting uses the soft new growth that has not yet become firm. Semi-hardwood cuttings are taken just as the shoots begin to firm. Hardwood cuttings are inserted late in the season when the shoot has firmed and ripened, and, in the case of a deciduous plant, has lost its leaves.

In practice, it is only for a few species that the exact state of the material is important. The health and vigour of the cuttings and the conditions in which they are kept will have a greater influence on whether they root or not.

Learning to identify when a plant reaches the right stage for propagation is one of the key skills for a propagator. Calendar dates should be thought of only as a very rough guide.

PREPARING SOFTWOOD CUTTINGS OF GERANIUM (PELARGONIUM)

ABOVE 1. Select the length of cutting you require

ABOVE 2. Cut the stem just below a node (leaf joint)

ABOVE 3. Remove one or two lower leaves

ABOVE 4. Dip the cutting in rooting hormone liquid (or powder)

ABOVE 5. Insert the cutting in a pot of compost

PREPARING SEMI-HARDWOOD CUTTINGS OF HEBE

LEFT **Remove shoots from the plant, cutting them longer than required**

BELOW LEFT **Remove lower leaves from each cutting**

BELOW **Dip the prepared cutting in rooting hormone liquid (or powder)**

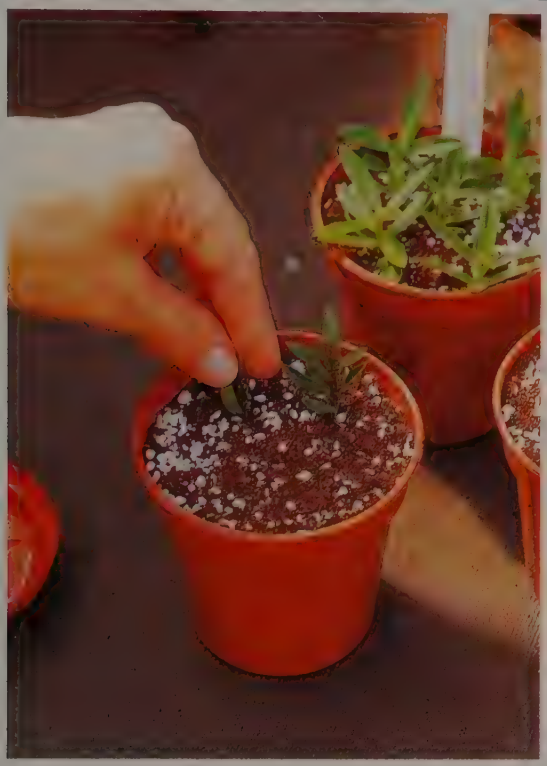
SOFTWOOD CUTTINGS

Softwood cuttings can be taken at any time of the year when there is fresh soft young growth available. This is often in the spring but new growth is produced at different times in different years and can also be stimulated by pruning or replanting. It is the condition of the material that is important not the date.

Cuttings taken from fresh, vigorous growth have the greatest potential to root and, under the right conditions, will normally begin rooting quickly. This can often occur within two to three weeks depending on the conditions. As the material is growing very fast and is very soft, it will wilt very rapidly once it is removed from the parent plant. Cutting material should be placed in polythene bags as soon as it is collected, and then inserted as quickly as possible. The soft nature of the cuttings also makes them particularly prone to diseases such as grey mould (*Botrytis*). Tools used to take the cuttings should be kept clean, and containers and composts should be either new or sterilized.

To take your cuttings follow the steps below:

1. Collect the cuttings in a polythene bag. Cut each shoot longer than you need, and do not attempt to prepare the cuttings in the garden.
2. Trim the base of the cutting between a pair of nodes (leaf joints) to leave at least enough stem to insert in the compost and support the cutting. This must include at least one node. For some plants it is often recommended that the stems are cut immediately beneath a node (nodal cuttings), but in practice it does not have a significant



ABOVE **Insert the cuttings in a pot of compost, so the lowest pair of leaves are just above the compost surface. Unless the cutting is very thin, you can do this without using a dibber**

ABOVE **Water pots of cuttings using clean water and a fine rose on the watering can. Note that these hebe cuttings have had their shoot tips removed to encourage them to branch out**

benefit and it is easier to use inter-nodal cuttings for most plants.

3. Trim the lower leaves from the cutting, leaving at least two pairs of leaves at the top.

4. If the cutting is large enough remove the shoot tip to encourage it to branch out.

5. Dip the base of the cutting into a hormone rooting compound – if required.

6. Insert the cutting into the compost so the lowest leaf is just above the compost surface. Unless the cutting is very thin or soft, you can do this without using a dibber. The cuttings should not be firmed into the compost (watering the compost will settle the cuttings). If you do need to help the cutting stand up in the compost, then take care not to firm the compost too tightly around the cutting.

7. Water the cuttings in thoroughly, label the container and then place it in a propagator as soon as possible.

8. Once inserted the cuttings will often show signs of wilting. If the atmosphere surrounding them is moist enough, they will usually recover in a few hours. If the lower leaves recover but the top ones or the tip of the cutting do not, then carefully trim off the wilted material to prevent it attracting grey mould.

Leaf-bud cuttings

This variation is common with plants such as *Clematis* and *Passiflora* that have very long distances between the nodes. This makes inter-nodal cuttings very thin and difficult to manage. Instead, cuttings are taken by trimming the shoot

PREPARING HARDWOOD CUTTINGS OF A YELLOW-STEMMED WILLOW

ABOVE **Collect shoots for hardwood cuttings once they have lost their leaves**

ABOVE **Prepare sections of stem, making a sloping cut at the top of the shoot and a horizontal cut across the base**

about 2.5cm (1in) below a node and then immediately above the same node, to leave a cutting with either a pair of leaves or a single leaf depending on the species. These are then inserted and treated as normal softwood cuttings.

Leaf-bud cuttings do need careful management as they only have either one or two buds to develop. If these are damaged by disease or sun scorch the cutting may root but it will not produce any shoots.

Leaf-bud cuttings are also used for camellias and mahonias, by trimming a piece of stem just above a leaf and 2.5cm (1in) below it. Make sure that there is a bud between the stem and the leaf joint. Insert this type of cutting so that the bud is level with the compost surface.

SEMI-HARDWOOD CUTTINGS

These are taken from the part of a shoot where it has just begun to ripen and become firm. In some species this is shown by a gradual darkening of the stem surface. Many plants are not particularly helpful in showing this, and therefore the shoots need to be examined closely and handled in order to check that they are firm enough. This part of the shoot is growing more slowly than the soft tip and the leaves will also have firmed up. As a result, the cuttings will be less likely to wilt the moment they are removed from the plant. They must, however, still be protected, particularly during the heat of the summer months.

Take semi-hardwood cuttings as follows:

1. Always collect the cuttings in a polythene bag. Cut each shoot longer than you need, and do not attempt to prepare the cuttings in the garden. If possible, remove one branch containing several shoots – this will help to prevent wilting in hot weather.
2. Remove the lower leaves from the cutting to leave at least two pairs of leaves. If, whilst you are in the process of removing the leaves by hand, either they or the stem show any signs of tearing, then trim the leaves away with sharp secateurs instead. Plants such as heathers have very tiny leaves that are difficult to remove without damaging the stem, so these cuttings will normally root more successfully if the leaves are left in place.
3. Trim the base of the cutting between a pair of nodes to leave at least enough stripped stem to insert in the compost and support the cutting. This must include at least one node. If the cutting is large enough remove the shoot tip to encourage it to branch out.

4. Dip the base of the cutting into a hormone rooting compound – if required.
5. Insert the cutting into the compost so the lowest leaf is just above the compost surface. Unless the cutting is very thin you can do this without using a dibber. The cuttings should not be firmed into the compost, as watering the compost will be enough to settle them. If you do need to use a dibber take care not to firm the compost too heavily around the cutting.
6. Water the cuttings in thoroughly, label the container and then place it in a propagator or cold frame as soon as possible.

Heel and mallet cuttings

With some species of plants, rooting is improved if the cutting is taken to include a short section of the previous year's growth at the base. These are called **heel cuttings**. Pull a fresh shoot gently off the main stem so that it comes away with a piece, or heel, of bark from the older stem. Trim the heel to remove thin or torn material and insert the cutting as before. Heel cuttings are used for some evergreen shrubs, deciduous shrubs with pithy stems (*Berberis*), and also for *Genista* and *Cytisus*, which have slender green stems that don't really become woody.

Mallet cuttings are a variation in which a short section of the main stem is left attached to the base of the young shoot. These are used for plants with pithy stems that produce many short side shoots, such as deciduous forms of *Berberis* and *Spiraea*. Take a stem of the previous season's growth and cut it into sections, each with a side shoot of new growth and a 'plug' of older wood at the base. Cut just above each side shoot and 2.5cm (1in) below. Treat these as semi-hardwood cuttings.

Ways of rooting semi-hardwood cuttings

In our experience the easiest way to root many deciduous semi-hardwood cuttings is to use a sun tunnel (see chapter 4). This is an excellent method if you plan to take a number of cuttings at one time, as a sun tunnel needs to be filled and then sealed and the cuttings left to root. A cold frame is ideal for a few cuttings taken at intervals, and allows for you to add individual pots or trays as required.

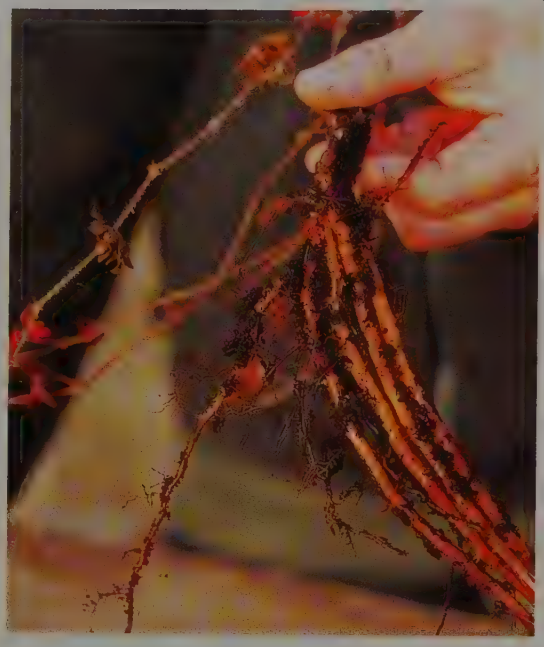
Whilst timing is not critical with many deciduous semi-hardwood cuttings, they do need to be inserted early enough in the year to give them a chance to begin rooting before they drop their leaves. In practice this means early to mid-summer is the ideal time, and at the latest

INSERTING HARDWOOD CUTTINGS OF A RED-STEMMED WILLOW IN A TRENCH

ABOVE **Fill the base of a narrow trench in the garden with sand and insert the cuttings along one side**

ABOVE **Backfill the trench with soil and compost to leave the top bud above the surface. Note the tops of the stems have a sloping cut**

PREPARING ROOT CUTTINGS OF GERANIUM (CRANESBILL)



ABOVE This plant of *Geranium sanguineum* var. *striatum* has been dug up, and shows several strong, healthy roots suitable for root cuttings

ABOVE Select pencil-thick pieces of root and cut into sections, taking care that you know which end was nearest the crown of the plant (top end)

ABOVE Prepared root cuttings – straight cuts at top, sloping cuts at the base

LEFT Insert several cuttings vertically into a pot of compost

ABOVE The cuttings have been inserted, and the straight top ends are just level with the compost surface

they should be inserted by late summer.

Evergreen cuttings cannot be rooted in sun tunnels as the high humidity and temperature causes them to drop their leaves before they begin to root. Timing is not as important with evergreens although they should be inserted while the plants are still in active growth.

For evergreen species there is less of a distinction between semi-hardwood and hardwood cuttings, and in practice it is easier to treat them both in the same way. We have found that both of these types of cutting will root readily on either a shaded greenhouse bench or in a cold frame. With most species rooting is not rapid and cuttings inserted in early autumn will usually take until mid-spring before they are well established.

HARDWOOD CUTTINGS

Deciduous hardwood cuttings are taken using shoot material that has firmed completely and has lost its leaves at the end of the growing season. Care should be taken when selecting shoots from some species to ensure that only the current year's growth is used; older wood will normally not root at all.

The best time to take the cuttings is either immediately after leaf fall in the autumn or just before the buds begin to swell in early spring. During the winter months the shoots go into a dormant state and if removed will sit in their compost and do very little except begin to rot if the conditions are at all unfavourable.

To take your cuttings proceed as follows:

1. Collect the material for your cuttings as long shoots and take them under cover before beginning to prepare them.
2. Trim off the thin end of the shoot and then cut the remaining shoot into 15–20cm (6–8in) lengths. With no leaves, it can be difficult to tell which end was the top of the shoot and which the bottom. To ensure the cuttings are inserted the correct way up make a horizontal cut across the base of the cutting (nearest the crown of the plant), and a cut at the top sloping away from the top bud.
3. To root the cuttings in the open garden dig a narrow V-shaped trench and place a layer of clean sand in the base. Stand the cuttings along one side of the trench and backfill, firming the soil gently with your foot.
4. If rooting under cover, insert the cuttings around the edge of a deep pot of compost and water them in well to settle them in place.
5. If you want to produce a single-stemmed plant or tree, insert the cuttings with only one bud above the surface. For multi-stemmed bushes, use longer cuttings and leave several buds above the compost to develop.
6. Cuttings in the garden should be checked periodically during the winter to ensure that they have not been loosened and lifted by frosts. If they have, wait until the soil has thawed and then carefully firm them in again.
7. Cuttings in the garden will need to be left in their bed until the following autumn when they should be large enough to move to their permanent positions. Cuttings rooted in pots may need to be repotted into individual containers in the early summer and then planted out the following autumn or spring depending on the species and how rapidly the plant is growing.

ROOT CUTTINGS

Propagation by this method depends on the ability of some roots to produce stem buds, which is usually greatest during a plant's dormant season. As with stem cuttings, the best results are obtained with fresh, healthy root material that has been growing rapidly. If the plant you wish to propagate is old, then pruning part of the roots back in the spring should encourage new, more vigorous roots to develop.

Follow these steps to take your cuttings:

1. Either carefully lift the mother plant and wash the soil from its roots or, for larger plants, carefully dig around part of the root system

and remove a few roots from as near to the base of the plant as possible.

2. Select material about the thickness of a pencil (for some plants, particularly perennials, thinner roots may have to be used).

3. As with hardwood cuttings, it is vital to be able to insert the cuttings the correct way up. The easiest way is to make a horizontal cut at the top of the cutting (nearest the crown of the plant) and a sloping cut at the bottom. Cut the roots into lengths of about 2.5–5cm (1–2in).

4. Insert the cuttings vertically into pots of compost so the top of the cutting is just level with or just below the surface. Lay thinner cuttings horizontally on the surface of a pot or tray and then cover them with a thin layer of cuttings compost. If you become uncertain of the top and bottom of thicker cuttings, you can lay these horizontally but the results may be poorer.

5. The cuttings will root over several months if left in a cool place, but this can sometimes be reduced to four to five weeks if gentle bottom heat of 18–21°C (65–70°F) is provided.

6. Once shoots begin to develop, the cuttings should be potted on and then grown on, as with normal cuttings.

LEAF CUTTINGS

Leaf cuttings are a relatively easy way to propagate some plants, particularly popular types of houseplant, such as *Saintpaulia*, *Streptocarpus* and *Begonia*. The cuttings are made either using whole leaves or cut sections of the leaf. The new plants will develop from the main veins of the leaf so at least a part of these must be included in any cut sections. Leaves chosen for cuttings should be young and healthy and fully developed.

As the material that you are working with is very soft it is essential to use only the sharpest tools. We have found that a scalpel or small craft knife with a replaceable blade is ideal. If a brand new blade is used for each batch of cuttings, not only will it be razor sharp but it will also be clean and help prevent infection of the cut surfaces.

Follow these steps for taking your cuttings:

Whole leaves – for plants such as *Peperomia* and *Saintpaulia* which have relatively small leaves:

1. Cut single leaves from the mother plant and trim the leaf stalks to 2–3cm (¾–1in). Insert the leaf stalk into a pot of cutting compost so that the leaf blade is just touching the surface. Water the compost thoroughly.

2. Cover with a propagator or polythene bag.

3. Rooting will be more rapid with a gentle bottom heat of 18–21°C (65–70°F), but a warm light windowsill out of the direct sun will also produce good results.

4. Each leaf may produce several small plantlets. These should be left until they are large enough to handle and then carefully separated and potted into individual pots.

Whole leaves – for plants with larger leaves such as those of *Begonia rex* hybrids:

1. Cut a single leaf from the mother plant, and then with a sharp knife make cuts across the main veins on the underside of the leaf.

2. Lay the leaf right side up on a tray of compost. Hold the veins on the underside in contact with the compost with short wire staples or small stones placed between the veins.

3. Place the tray into either a propagator or large polythene bag.

4. Rooting will be quicker in a propagator heated to 18–21°C (65–70°F) but a warm light windowsill out of the direct sun is suitable.

5. Each cut in the vein should produce a small plantlet. When these young plants are large enough to handle, carefully separate them with a sharp knife and pot them into individual pots.

Leaf sections – for larger-leaved plants, such as the Cape primrose (*Streptocarpus*):

1. Cut a single leaf from the mother plant.

2. Using a sharp knife cut the leaf into sections about 2.5cm (1in) long.

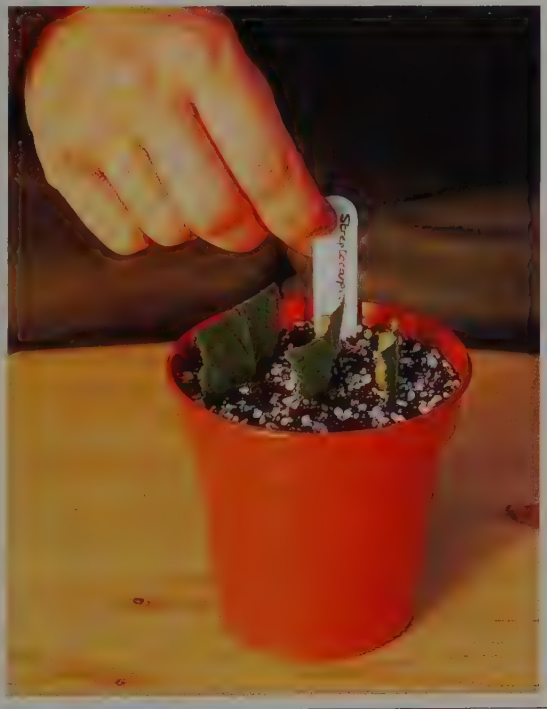
PREPARING LEAF CUTTINGS OF CAPE PRIMROSE (*STREPTOCARPUS*)

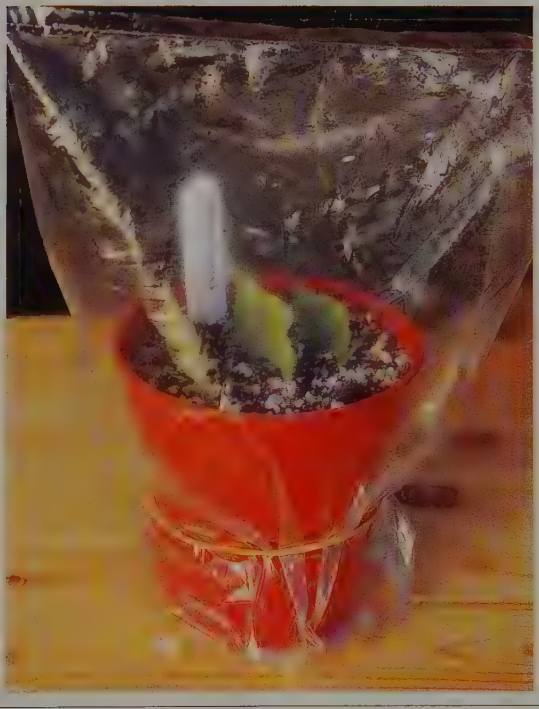
ABOVE Cut a single healthy leaf into sections using a sharp, clean scalpel

RIGHT Insert the sections vertically into a pot of compost, pushing in just enough so that they stand upright

BELOW Label the pot of cuttings and water them in thoroughly

BELOW RIGHT Place a plastic bag over the pot and secure with an elastic band to retain a humid atmosphere (alternatively, place in a propagator)





3. Insert the sections vertically into a pot or tray of cuttings compost. Make sure you water the compost thoroughly.
4. Place the container into either a propagator or large polythene bag.
5. Rooting will be quicker with gentle bottom heat of 18–21°C (65–70°F), but a warm light windowsill out of the direct sun will also produce good results.
6. Each section should produce a small plantlet, which can be potted up individually when large enough.

IRISHMAN'S CUTTINGS

With a number of plants, particularly spreading and ground cover plants, it is possible to remove shoots with roots attached, which can then be potted up and grown on, as with normal cuttings. Do not use a rooting hormone with these, even if the roots are only very small, as this may prevent the roots from developing further.

Prior to removing the cuttings from the parent plant it is important to water the soil well. This will make the soil easier to break up, and will help some of it to adhere to the roots. In all but the lightest soils it is necessary to loosen the area from which the cuttings will be taken with a hand fork. After this the shoots can be gently pulled apart and cut from the main plant with secateurs or a sharp knife.

Irishman's cuttings, by their very nature, are often misshapen and it is important to trim them well once established to produce a well-shaped plant.

If individual rosettes from plants such as saxifrages, sempervivums and jovibarbas are carefully pulled from the plant they will often come away with roots attached. They can then be potted up and will grow away quickly.

RIGHT **Individual rosettes of *Jovibarba arenaria* can be removed and rooted – in fact, they readily detach and root themselves very easily**

CHAPTER 3

Composts, containers and tools

COMPOSTS FOR CUTTINGS

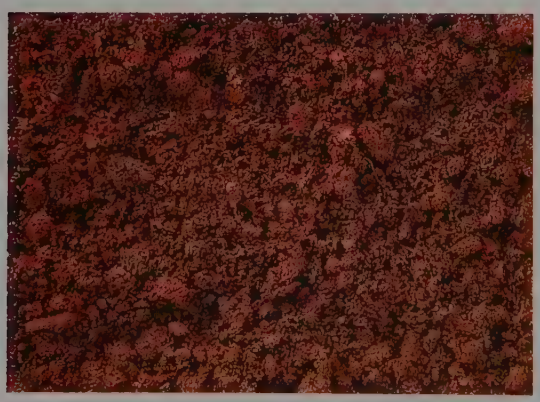
Every keen gardener has his or her own preferred propagating mix. To be successful, any propagating compost must provide the cuttings with their basic requirements of moisture, air and support. To do this, the compost needs to be open and well drained so that it will retain moisture but never become waterlogged and exclude air. There is no ideal, single mix. Larger plants, such as many shrubs, will root well in an open, coarse compost, while fine-rooted plants such as heathers and alpines respond well to a finer mixture with pore sizes nearer that of their delicate roots.

COMPOST COMPONENTS

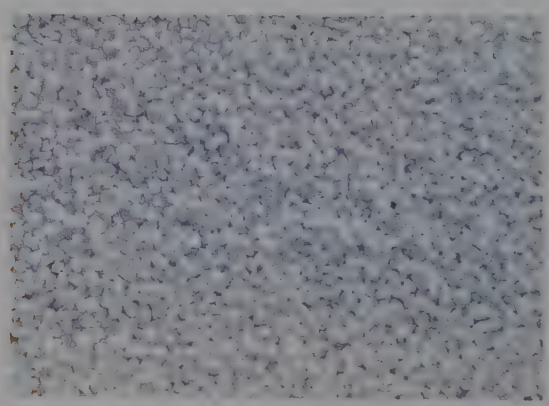
There are many different materials that can be used in cuttings composts, and they should all be as clean and sterile as possible. Materials that are not currently being used should be kept in closed bags or containers to prevent weed seeds and fungal spores from contaminating them. In our experience, the following are the most useful for rooting cuttings.

Peat

Peat is available in two distinct types. The first is sedge peat, which is a dark, almost black peat often used in growing bags and some potting composts. It has a fine, close structure, which can lead to poor aeration and drainage, making it generally unsuitable for cuttings composts. On the other hand, moss or sphagnum peat has a much more fibrous structure, which aids moisture retention and helps to produce a more open mixture. It is



ABOVE **Moss or sphagnum peat has a fibrous structure**



ABOVE **Perlite is a very light, granular, sterile material**

available in several different grades; we have found that a good quality fine grade is ideal for most mixtures. Avoid cheap products as they often contain very poorly graded peat with large lumps and even weed seeds.

Perlite

Perlite is a volcanic mineral, produced by a heating process at very high temperatures. A light, granular, sterile material, it is excellent for adding aeration and drainage to composts. It can be bought in several different grades, the medium and fine sizes being the most suitable for cuttings. As fresh perlite is very dry, wearing a dust mask is important when handling it, to protect against the fine dust which is produced when it is tipped from the bag. Watering the perlite before tipping it out can be very effective at reducing the amount of dust produced.

Bark

Fine bark chips added to peat produce a very open structure which drains freely. We have found this to be very effective, particularly when used in modules. It is important to use only bark chips and not products sold as composted bark as this contains too much powdery material and is often not sterilized.

Grit

This is one of the most effective compost ingredients, and it is readily available in several different types. We have found that the flint grit sold for poultry is the cleanest and easiest to use, usually being available in several different sizes, with the chick grade being the most suitable for cuttings. When mixed with peat it makes a free-draining compost with fine pores, which is particularly suitable for smaller plants with thin roots, such as heathers and many alpines.

Vermiculite

This is a mineral similar in origin to perlite. Its structure is, however, much more open and it can absorb a considerable quantity of water. When used with peat, the resultant compost needs very careful watering to prevent it becoming waterlogged. It can, however, be very effective when used on its own for rooting some softwood cuttings.

ABOVE **Fine bark chips can be added to peat to produce an excellent open-textured propagating medium**

ABOVE **Flint grit is available in several different grades**

ABOVE **Vermiculite is a very light mineral capable of absorbing a great deal of water**

ABOVE **The houseplant *Ruellia* can easily be rooted in a jar of water**

Water

Some easy-to-root subjects, such as geraniums (pelargoniums), will produce roots if suspended in a jar of water. This is generally more effective if the jar is kept in the warm so that roots can form before the stem begins to rot. Once cuttings have been rooted in water, great care is needed when potting them on as the roots will be very delicate and can easily be damaged by hard compost particles, leading to a check in growth or at worst the death of the cutting. Changing the water every few days is a good idea, as the fresh water will contain more oxygen, which the roots need to develop.

Garden soil

Garden soil should only be used for hardwood cuttings that are being inserted directly into the ground. Soil is very variable and will contain a large number of weed seeds together with an equally large number of potential pests and diseases. Even when it is sterilized the physical characteristics of garden soil are so variable that results will be unpredictable.

Ready-mixed composts

We have not found bags of ready-mixed cuttings compost in any garden centre. There are a large number of brands of what are described as *seed and cuttings compost* or *multi-purpose compost* available but in our experience these are all a compromise and while easy-to-root subjects will perform well in them, the results with more challenging subjects can be very poor. As only small quantities are required, it is far better to buy the individual components and mix your own cuttings compost.

Fertilizers

The addition of fertilizer to a cuttings compost is not necessary for promoting rooting, and the presence of even moderate amounts of nutrient can inhibit the rooting of some species. We have found that the best approach is to wait until the cuttings have begun to root and then begin regular feeding with a balanced liquid fertilizer at about a quarter of the normal strength. This will provide enough nutrients until the cuttings are ready for potting up.

Suggested cuttings compost mixes

Many gardeners who are also successful propagators, have devised their own particular compost mixes that work for them. If you have found a mix that works well in your conditions, then stay with it, or try our suggestions before changing over to them completely. Every garden and gardener is different, but we have found that the following mixes are very successful and work well in a range of different conditions. The proportions are by dry volume.

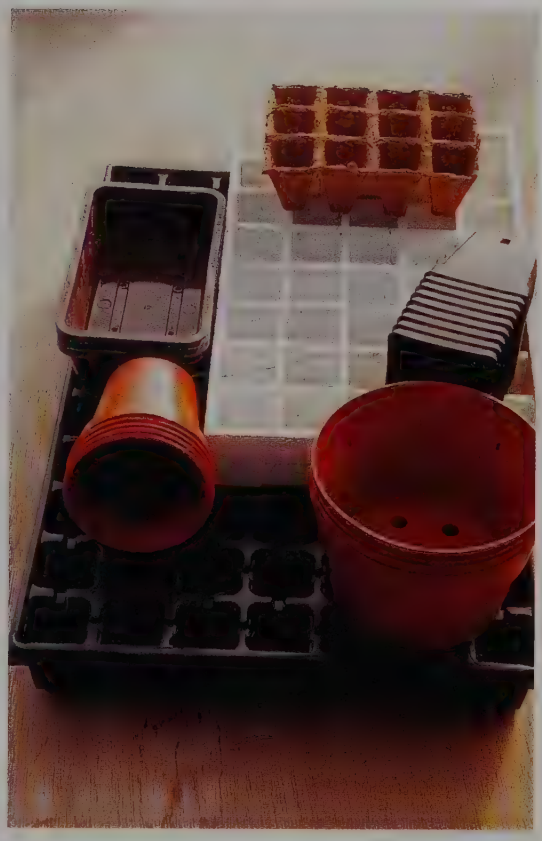
General mix – suitable for most cuttings

1 part fine peat
1 part fine grade perlite or bark

Small cuttings mix – suitable for many alpines, heathers and smaller perennials

3 parts fine peat
2 parts fine grit (chick grade if you are using poultry grit)

ABOVE **If you need to reuse old pots and seed trays, always wash them thoroughly, using soap and warm water, before using for cuttings**



ABOVE **A selection of suitable containers for cuttings – plastic pots in varying sizes, quarter seed trays, and cell trays in plastic, polystyrene and compressed peat**

When you mix compost, use a clean container to measure out each ingredient and mix the compost with a clean trowel (or spade) on a clean surface. It is a good idea to mix a batch of compost and then store the surplus in a covered container. You will then always have a supply ready to insert cuttings when the suitable material becomes available.

CONTAINERS FOR ROOTING CUTTINGS

Almost any type of container can be used for rooting cuttings provided it has good drainage. Clean containers are essential as newly inserted cuttings are very vulnerable to disease, and fungal spores can hide in even a thin layer of old compost. Whenever possible use new containers, but if old ones need to be reused, wash them thoroughly first in warm, soapy water. Rinse them and let them dry before filling them with compost.

TYPES OF CONTAINER

Pots

If you are only interested in a few cuttings then plastic pots are ideal. A round 9cm (3½in) pot will hold between three and nine cuttings, depending on their size. We have found that 12.5cm (5in) dwarf pots are particularly useful, holding up to 20 cuttings of small shrubs. They are about the same height as 9cm (3½in) pots, and they fit together well with them in a propagator. Where space is at a premium, square pots are ideal, allowing more pots to be

ABOVE **Modular or cell trays allow each cutting to form its own discrete root system, minimizing disturbance when potting up**

fitted into a given area. It is possible to use traditional terracotta pots but they take up more space and need careful management to prevent them drying out.

Trays

Seed trays can be used for smaller cuttings but they are not deep enough to provide the support required for many shrubs and perennials. We use quarter seed trays 17.5 x 10.5cm (7 x 4in) for many alpines and heathers. Deeper plastic produce trays can be used if they have good drainage – they are ideal for rooting hardwood cuttings of plants such as *Cornus* in the greenhouse or cold frame.

Cell trays

Cell trays, or modules, allow individual cuttings to develop their own discrete root systems, which minimizes the damage caused when they are potted up. Although individual cuttings can easily be removed from the trays, it is a good idea to fill a tray either with just one variety or varieties that will root in about the same time. However careful you are when removing individual plants, some disturbance will occur in the other cells and if the cuttings are not well established, they may suffer.

There are many different types of cell or modular tray available. Their suitability for cuttings varies considerably, the best being made of rigid plastic and with large drainage holes. Some of the very thin plastic trays have only small drainage holes, which need to be enlarged before they can be used. We have found that while cuttings root readily in expanded polystyrene trays, the roots often grow into the polystyrene itself, causing considerable root damage on removal. Many different diameters and depths of individual cell

RIGHT **These geranium (pelargonium) cuttings are being rooted in Jiffy pellets, which have first been soaked in water to allow the compressed peat to expand. The whole structure can be potted up once rooting has taken place**

are available. Choose a size that will allow your cuttings to develop a good root system before they need to be potted on.

Peat pots

Like cell trays, these are available in many different sizes, both as individual pots or groups of cells. Cuttings can be rooted in them as if they were pots or cell trays, the roots developing in the compost and eventually rooting into the peat of the pot. They are then potted on without removing the pot. They can be very effective for plants that resent root damage, such as *Escallonia*, but they need careful management. If the peat is allowed to dry out it will kill any roots growing into it and check growth considerably.

Jiffy pellets consist of compressed peat, which expands when soaked in water to make a self-contained pot of compost. They are ideal for quick-rooting plants such as fuchsias and geraniums (pelargoniums). Most types have a ready-formed hole in the centre; if this is filled with clean sand, the improved drainage allows a greater range of species to be rooted. Like peat pots they have a tendency to dry out – we have found that standing them on capillary matting helps to avoid this.

TOOLS FOR PROPAGATION

Traditionally, gardeners used knives for preparing cuttings, but now even on commercial nurseries secateurs are more frequently used. Using a knife safely is a definite skill, which takes a considerable time to learn, while secateurs can be used successfully with very little practice. Whatever tool is used it must be kept sharp to ensure that all the cuts are made cleanly without snags or bruising.

SECATEURS

There are two main types of secateur available.

Anvil secateurs have a sharp blade that cuts down onto a flat anvil. These are not generally suitable for preparing cuttings because, unless the blade is kept very sharp, they can crush the stem and cause damage to soft tissue.

ABOVE **Use secateurs for large or tough cuttings, finer secateurs for the majority of cuttings, and fine-pointed scissors for delicate or thin-stemmed cuttings**

Bypass secateurs have two blades that pass each other, and these produce a much cleaner cut, but can still cause damage and snagging if they are not kept sharp.

Many manufacturers now produce secateurs in a range of sizes. We have found that the smallest models are usually the best as they have more delicate tips and are easier to control when preparing cuttings. When choosing your secateurs, price is usually a good indicator of quality. Many of the more expensive models have removable blades, which can readily be sharpened or replaced, while cheaper types are often difficult to sharpen and need to be replaced regularly to prevent damage to the cuttings.

SCISSORS

We have found that for small delicate cuttings, such as those of many alpines and heathers, a good sharp pair of small scissors is ideal. We frequently use a pair of fine dissecting scissors for thin-stemmed soft cuttings.

KNIVES

Traditional propagating knives have hollow ground carbon steel blades, which can be

ABOVE **A sharp knife can be used to take cuttings, but you need care and skill to use it safely and correctly**

sharpened to a very keen edge. Many modern knives have stainless steel blades, which will not take a very keen edge and as a result can be difficult to use effectively. If you want to try using a knife, search for one with a carbon steel blade – and it is a good idea to wear stout gloves until you become proficient!

The only knives that we use are scalpels with disposable blades. These are ideal for making leaf cuttings when a very sharp blade is essential to avoid tearing the leaf tissue. If a new blade is used for each session it will always be sterile and sharp.

Cleanliness is very important. Ideally, keep one set of tools for propagating and avoid using them for general gardening. After each session clean the sap of the blades with a moist cloth and then wipe the blades with a lightly oiled rag to prevent corrosion. As soon as the blades begin to snag the plant material, either sharpen them, replace the blade or with cheaper models replace them altogether.

ROOTING HORMONES

Rooting hormones are synthetic versions of the naturally occurring chemicals that stimulate plant stem material to produce roots. They can only encourage rooting on material that has an inherent ability to root. They will not produce roots on old or sick material that has lost its ability to produce roots.

WHY USE SYNTHETIC HORMONES?

Cuttings from many plant species will root without the use of hormones. However, the rooting process, particularly with woody plants, can be very slow leading to rotting and stem breakdown before roots are formed. Using a hormone speeds up the development of roots and will normally increase the percentage of cuttings that root successfully. Most rooting compounds also contain a fungicide, which reduces loss due to disease infections on the vulnerable cut stem.

The effects of the hormone can vary greatly between species, and commercial growers use a range of different strengths suited to particular species. Amateur compounds are usually all of a similar strength, designed to give good results over the widest possible range of species.

ABOVE **Never dip cuttings directly into the container of rooting hormone – you may contaminate it with moisture, plant material or disease**

ABOVE **This cutting has far too much hormone rooting powder on it, and it is too far up the stem**

ABOVE **Dip just the base of the cutting in rooting powder and tap gently to remove any excess**

Hormones can also have disadvantages. The application of too much hormone can prevent the formation of roots by distorting the base of the stem, or in some plants root production is stimulated so much that the cutting is unable to produce new shoots and grow normally. For the same reason hormones should not be used on root cuttings.

USE ROOTING HORMONES SUCCESSFULLY

Rooting hormones – both powders and liquids – break down naturally over time, and this process can be speeded up by exposure to heat or contamination by soil or plant material. To ensure you get the best results from your rooting hormone, follow these basic rules:

ABOVE **If using a liquid rooting hormone, just dip the base of the cutting in**

Never...

- ...store compounds in full sun, or on a greenhouse shelf.
- ...dip the bases of cuttings directly into the hormone container.
- ...return used hormone powder or liquid to the original container.

Always...

- ...tip a small quantity of hormone into a separate container before use and dispose of the excess at the end of each session.
- ...replace your hormone compound at least every two years, and ideally each year.

APPLYING ROOTING HORMONES

Rooting hormones are available as either powders or thick liquids. In our experience, the liquid preparations are easier to handle and very difficult to apply in excess. We have found that the following method gives the best results with both types of hormone.

1. Tip a small amount of hormone into a clean container (not the lid of the hormone bottle). We use a small, cleaned yoghurt or cream container with the top cut away to leave a shallow dish, or a small, clean plastic plant saucer.
2. Dip 5–10mm (¼–½in) of the base of the cutting into the hormone. The cutting should be damp enough for sufficient powder to adhere.

3. Remove the cutting from the hormone. If using a powder, tap the cutting gently on the side of the container, to remove any excess. Liquid compounds should be allowed to drip if necessary, but it is unusual for enough excess to adhere.
4. Insert the cuttings into the compost.
5. At the end of the session dispose of any excess hormone (following the instructions on the bottle) and wash out the container.

COLLECTING CUTTING MATERIAL

We have already seen that in order to root successfully, cutting material needs to be kept fresh and firm and free from physical damage, from the moment it is cut from the plant until it is inserted into the propagating compost.

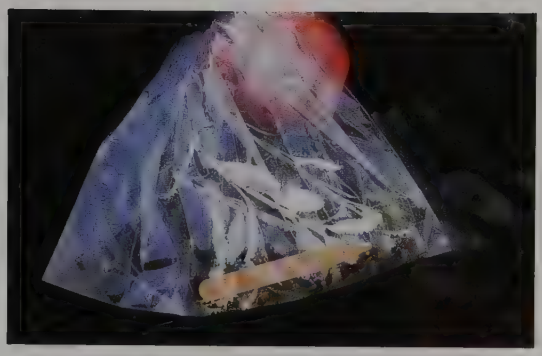
Cuttings are at their most vulnerable when they are first cut from the stock plant. Softwood cuttings, in particular, will wilt very quickly.

The best time to collect cuttings, especially during the summer months, is early in the morning when they are still very firm and cool. As soon as it is cut, the material should be placed in a polythene bag before taking inside for preparation.

It is a good idea to label the bag, as cuttings from different varieties of the same plant can look very similar when you get them inside! If you are dealing with several batches of material at a time, place the bags under the bench or in the shade, until you are ready for them.

If there is going to be a delay between collecting the cuttings and preparing and inserting them, we would recommend that you wrap the cut ends in some moist kitchen paper to prevent them drying out.

The cuttings can be kept in this kind of wrapping for several hours, until you are ready to insert them. Deciduous hardwood cuttings with no leaves are not as prone to water loss but they should still be placed somewhere cool after collection, as even in the winter the sun has enough power to dry them if given the chance.



ABOVE **Place cutting material in a polythene bag as soon as you collect it, together with a label containing the plant name**

ABOVE **If you are unable to deal immediately with cuttings, wrap the cut ends in moist kitchen paper and wrap a plastic bag around them to keep the atmosphere humid and prevent them drying out**

Do not try to prepare a cutting at the time you are collecting it from the parent plant. If your stock plants are large enough, remove small branches and then prepare the cuttings from them in the potting shed. Finally, if material is limited, cut shoots that are slightly longer than required to allow you to remove at least one pair of leaves before inserting the cutting.

CHAPTER 4

Propagation facilities

In order to root successfully, most cuttings will benefit from some kind of protection from the elements. The type of protection required varies according to the type of cutting. Softwood cuttings are the most vulnerable of all and need to be kept in an enclosed, moist environment to prevent them wilting and drying out. Semi-hardwood cuttings need less protection in the autumn and winter, but cuttings inserted in mid-summer need to be kept in an enclosed environment to protect them from the desiccating effects of the summer sun. Hardwood cuttings are the least vulnerable to desiccation but only the most vigorous of these (for example, *Salix* and *Cornus*) can readily be rooted in the open garden.

STRUCTURES FOR CUTTINGS

There are many different types of structure suitable for rooting cuttings. In our experience, simple home-made propagators are just as effective as some of the very expensive models available from garden centres. The real secret of success is, of course, in the careful preparation and management of the cuttings rather than the appearance of the propagator.

INDIVIDUAL POTS

One of the simplest ways to root a small number of cuttings is in an individual pot on a greenhouse bench, or even on a windowsill. It is possible to buy small rigid covers designed to fit on or over a pot, but the same results can be obtained by using a clear plastic drinks bottle. Cut the bottle in half and wash it out thoroughly with detergent (if a sugary deposit remains it will attract moulds which could then infect the

RIGHT **The top half of a clear plastic drinks bottle makes an ideal cover for a pot of cuttings**

LEFT **Individual pots of cuttings can be enclosed in polythene bags, using labels or small sticks to keep the bag from touching the cuttings. Remove the bags and shake out the condensation every few days**

cuttings). The top half makes the most effective propagator as the screw top can be removed once the cuttings have rooted, in order to begin to harden them off. Using a pot slightly larger than the diameter of the bottle will allow it to be pressed firmly into the surface of the compost to help retain moisture. Even with ventilation at the top, condensation will build up and it is a good idea to remove the cover once a week or so and shake out the excess moisture.

Pots of cuttings can also be enclosed in polythene bags. To prevent the bag collapsing place three short sticks around the edge of the pot and then fasten the bag to the pot with a rubber band. Alternatively, the pot can be placed in the bottom of the bag which is then blown full of air and sealed at the top. Polythene bags have the disadvantage that moisture builds up very rapidly; they should be removed every two or three days and the condensation shaken off. This prevents the leaves becoming damaged by an excess of water droplets. Once the cuttings have begun to root, ventilation can be increased gradually by cutting more and more holes in the bag.

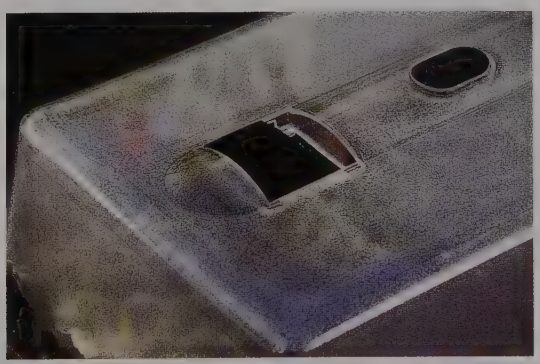
Whichever method you choose to cover your cuttings, you should keep them out of bright sunlight, as even in the autumn and winter the droplets of condensation act as tiny lenses, magnifying the light and scorching the leaves.

UNHEATED PROPAGATORS

Once the propagating bug begins to bite, you will want to fill more than a few pots. It is easier to put several pots into one enclosed propagator rather than covering each individual pot.

There are a large number of different types and sizes of plastic propagators available from garden centres. These usually consist of a plastic base tray with a rigid plastic lid that fits over the top. The most useful ones are those which have built-in ventilators in the lid to allow control of the atmosphere around the cuttings.

ABOVE **A typical unheated propagator consisting of a plastic base tray and a rigid clear plastic lid with ventilators. Keep these closed until rooting has taken place**



ABOVE **Once the cuttings have rooted, gradually open the ventilators to accustom the cuttings to a less humid atmosphere**

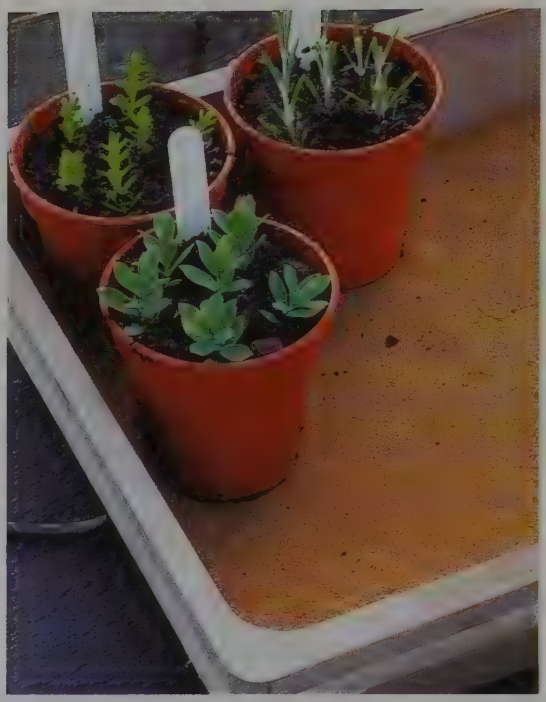
Making your own unheated propagator

If you have basic DIY skills it is very easy to make your own propagator. The simplest kind consists of a shallow box over which you can support polythene on hoops of stout wire or plastic pipe. This will form a domed shape and allow condensation to run away to the sides rather than running to the centre and dripping onto the cuttings beneath. If you use a polythene cover it can be ventilated by raising a corner and simply pegging it up to one of the supports with a clothes peg. We have found that one of the best materials to use to make the sides of the base is the plastic moulding sold in large DIY stores to make drawer sides. If this is used with the corner connectors that are available to fit it, bases can be made very quickly and to whatever size will fit the space you have available. Using plastic moulding has the added advantage that it will not rot and is easy to clean and sterilize.

Maintaining humidity

Whatever type of propagator you choose, it is a good idea to line the base with either capillary matting or clean sand. This will help to provide a reservoir of water to keep the atmosphere moist around the cuttings. It is particularly important when only a few cuttings are put into a larger propagator, as the small surface area of compost around the cuttings may not create enough moisture to fill the whole propagator.

ABOVE **During bright, sunny periods make sure you protect your cuttings by covering with shade netting, as they will easily scorch**

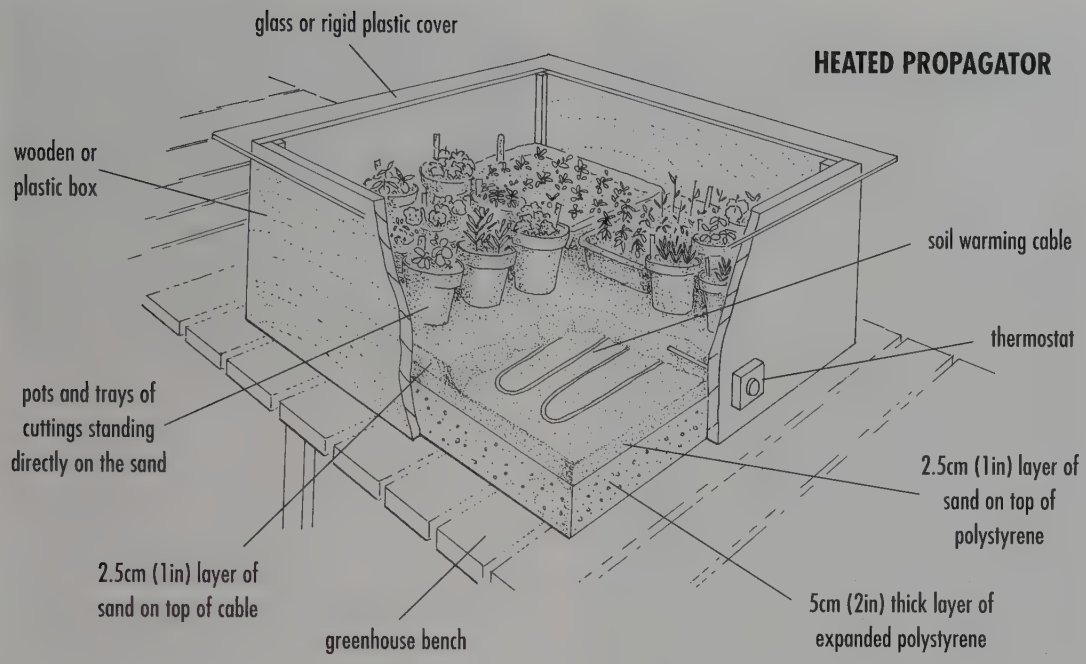


ABOVE **A simple heated propagator with a plastic base containing a heating element. The layer of sand in the base helps maintain a humid atmosphere around the cuttings once the lid is put on**

The structure must also be protected from bright sunlight. Avoid placing propagators on the south side of a greenhouse where they are in the full sun. During the summer, in particular, they will need shading. The best method is to use one or two layers of shade netting which can be removed during periods of dull weather.

HEATED PROPAGATORS

The main benefit for most cuttings of using a heated propagator is to speed up the rooting process. Heat does not cause roots to be produced but it will increase the rate at which they develop. For some more vulnerable or difficult species, heating means that the roots will develop before the top part of the cutting starts dying, or becomes diseased, resulting in a much higher success rate. In many cases, the benefit is in the speed of the rooting process and the more vigorous root systems that are often produced.


HEATED PROPAGATOR
glass or rigid plastic cover
wooden or plastic box
soil warming cable
thermostat
pots and trays of cuttings standing directly on the sand
2.5cm (1in) layer of sand on top of polystyrene
2.5cm (1in) layer of sand on top of cable
5cm (2in) thick layer of expanded polystyrene
greenhouse bench

Types of model available

Heated propagators are available in a range of different designs. The simplest types are very similar to the unheated plastic tray models but they include a heating element built into the base. These are very easy to use and just need to be plugged into a safe electrical supply. The biggest disadvantage of these simple types is that they do not have any form of temperature control so it is not possible to adjust the heat they give out. In hot weather they may give out too much heat (they are very unlikely to get too hot for the cuttings, but will waste electricity), while in colder weather they may not give out enough heat to be very effective.

Larger, and invariably more expensive, models usually have some form of thermostat to control the temperature. Some are set to a fixed temperature but the best types have a variable control that will allow them to be adjusted for different cuttings, or for germinating seeds.

Making your own heated propagator

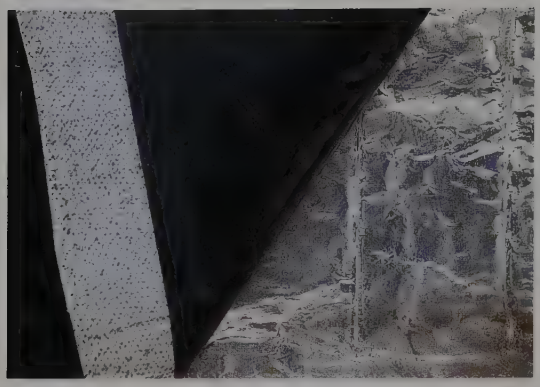
For those with DIY skills it is easy to build your own heated propagator. The heating elements can be bought from most garden centres and are usually supplied as sealed units, which just require plugging into a waterproof socket. These elements are available as two different types: soil warming cables and heating mats.

Soil-warming cables

These are the most commonly available type of element, made from a special type of waterproof cable that heats up when connected to an electrical supply. They are specially manufactured and ordinary cables should never be used. The best types to select are those which come ready-wired with a thermostat which avoids the need to hire an electrician to do any wiring. Cables are sold in different lengths to cover a range of base sizes; check with the supplier to ensure you get the correct size for your propagator.

To make your heated propagator base follow the steps below:

1. Construct a solid base, as if for an unheated propagator.



ABOVE **A heating mat showing the metal foil containing a heating element, overlaid with black polythene and then capillary matting**

2. Stand this base on a 5cm (2in) thick layer of expanded polystyrene wrapped in stout polythene. This will have the effect of reducing heat loss considerably.
3. Place a layer of about 2.5cm (1in) of clean sand on top of the polystyrene.
4. Lay the cable on top of the sand in a zig-zag layout, making sure that the loops are as evenly spaced as possible.
5. Insert the probe of your thermostat into the sand as directed by the manufacturer. (Some thermostats need to be inserted directly into the compost in the pots or trays.)
6. Cover the cable with a further layer of about 2.5cm (1in) of sand.
7. Water the sand to settle it down, and ensure that it is wet consistently throughout its volume. The sand should be kept moist at all times to ensure it conducts heat effectively.

● *Heating mats*

These consist of a heating element sandwiched between two layers of strong metal foil. They are sold as complete units whose size cannot be adjusted and they therefore have to be ordered to fit a particular propagator or bed. Their greatest advantage is that they are very simple to install and do not need to be buried in sand. They can simply be rolled out onto a bench or into a propagator. The surface is then protected with a layer of black polythene over which is laid capillary matting, and the bed is ready for use. As with sand beds, a 5cm (2in) layer of polystyrene under the bed will provide insulation and help prevent heat loss.

Thermostats for use with heating mats usually need to be inserted either into the pots of cuttings or placed on the capillary matting and then covered with the pots. We prefer to use the second method as it gives more accurate control of the temperature and is not affected by sunlight heating the surface of the pots.

Temperature

Using bottom heat makes the base of the cutting warmer than the tips. This has the benefit of encouraging root development instead of shoot development. The optimum rooting temperature for many plants is 15°C (60°F), although 15–21°C (60–70°F) is a commonly used range of temperatures in which a wide variety of plants can be rooted. Increasing the temperature in this way can often speed up rooting but may not necessarily be worth the extra heating costs. Lower temperatures will still encourage rooting, and over winter maintaining a temperature as low as 5°C (40°F) will still have a benefit, as rooting can be reduced severely if the cuttings are damaged by frost.

COLD FRAMES

A cold frame is ideal for rooting most types of cutting and can be easier to manage than a greenhouse where the environment has to be a compromise to suit a range of different requirements. In our experience, wooden-sided cold frames are more suitable for cuttings than those with glass sides. The wooden sides help to keep a more even temperature and only the top needs to be shaded from the sun.

If possible, site the cold frame on a concrete base in a position in the garden away from the midday sun. Cover the bottom of the frame with a layer of fine gravel to ensure good drainage.

ABOVE **A home-made, wooden-sided cold frame with a lift-up lid**

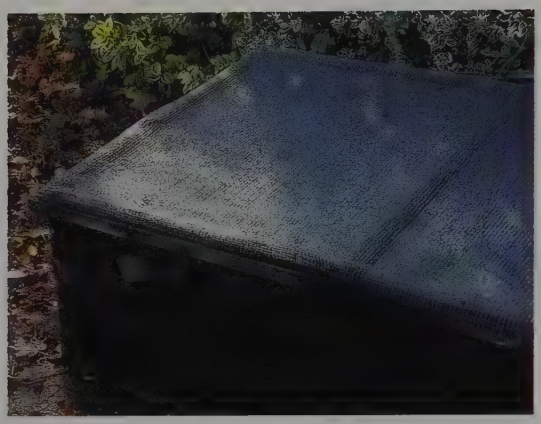
RIGHT **Cuttings taken in summer that will benefit from warmer conditions in winter can be put in individual pots in a cold frame, then moved into a greenhouse in autumn**

BELOW RIGHT **Semi-hardwood cuttings can be inserted directly into compost in a cold frame**

If the lid of the frame fits well, pots of semi-hardwood cuttings can be placed directly into the frame. Pots of softwood cuttings will benefit from being placed either under individual covers or in a propagator.

Alternatively, the whole of the cold frame can be filled with cuttings compost to a depth of about 10–15cm (4–6in) and the cuttings inserted directly into the frame. We have found that this method is ideal for evergreen semi-hardwood and hardwood cuttings, which can be inserted into the frame in autumn and lifted the following year.

Shading is important during periods of bright sunlight, even in late autumn and early spring. A piece of shade netting, which can be draped over the top of the frame, is ideal as it can be easily removed during periods of dull weather. We would suggest you avoid using paint or shading compounds as these are in place permanently, and can be instrumental in causing etiolated – elongated and usually blanched – growth if dull weather coincides with the start of shoot development.



ABOVE **Use shade netting over cold frames in periods of bright sunlight to protect the cuttings**

SUN TUNNELS

One of the easiest ways to root semi-hardwood cuttings of deciduous plants is by using a sun tunnel. These tunnels are very simple to construct, using white polythene over low hoops of either stout wire or plastic water pipe, as in the accompanying diagram. The size of the tunnel can be varied according to your needs, or the space available.

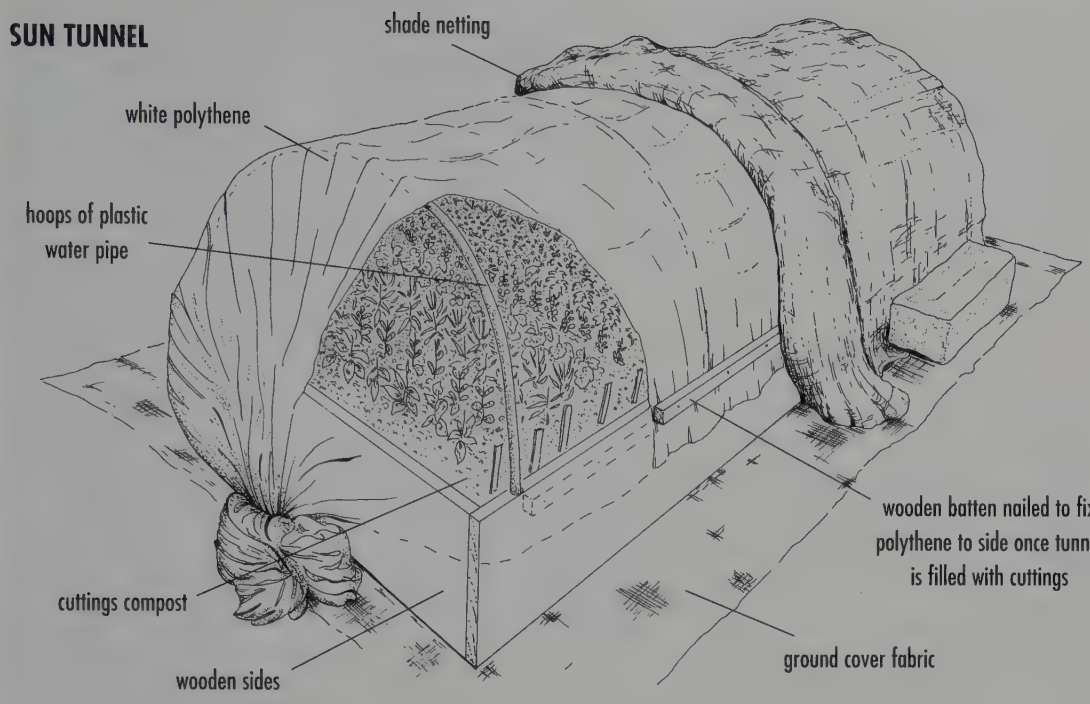
A structure 75cm (30in) wide and 1.2m (4ft) long will provide enough space for up to 300 cuttings, depending on their size. Cuttings need to be inserted away from the edges to avoid drips from the polythene, and tunnels smaller than the size above are less successful as the edge effect is proportionally greater.

Filling the sun tunnel

Once you have constructed your tunnel, fill the base to a depth of about 15cm (6in) with cuttings compost, then level the surface and water it well to settle it. If you are not going to insert the cuttings and put the cover on immediately, cover the compost with a layer of polythene to keep it free from weed seeds. In our experience it is best to insert the cuttings all in one day, or at the most over two to three days. Between each session the polythene can be held in place temporarily to retain moisture.

When the tunnel is full, water the cuttings in thoroughly and then seal the polythene to the base. We have found that wrapping the excess plastic on each side and each end around a narrow wooden batten helps to stretch the cover tight. The battens can be held in place either by nailing them to the side of the tunnel base or by placing some heavy bricks along their length.

ABOVE **A sun tunnel is easily constructed with white polythene over low hoops, and can be shaded during summer**


SUN TUNNEL
shade netting
white polythene
hoops of plastic water pipe
wooden batten nailed to fix polythene to side once tunnel is filled with cuttings
cuttings compost
wooden sides
ground cover fabric

The tunnel must then be covered with at least one layer of shade netting. In very bright weather, use two layers of shade netting.

Once the tunnel is completed, you need to be patient, as it should be left unopened for eight to ten weeks. If it has been sealed down well, the compost will remain moist and the atmosphere humid as the water is unable to escape. Large tunnels can be more difficult to seal tightly and these will benefit from the addition of a few fine irrigation nozzles which can be turned on for a few minutes every three or four days.

Treatment after rooting

Cuttings inserted in early summer should begin to show signs of rooting by late summer. As the time approaches, the cover can be opened occasionally to see how the cuttings are progressing, but make sure that it is resealed each time. Once all the cuttings show signs of rooting it is time to start weaning them from the humid environment within the tunnel. The best way to do this is to gradually slit the polythene more and more over a period of about ten days until it can be completely removed. A layer of shade netting over the tunnel will protect the cuttings from wind and bright sunlight.

Many species will be large enough to pot on in early autumn when the cover is removed. However, we have found that the rooted cuttings develop into better plants if they are left in the opened tunnel over winter, protecting them from wind with netting, or from severe weather with bubble plastic. They can then be potted on in early spring when they begin to show signs of new growth.

MIST PROPAGATION

This technique, which automatically sprays the cuttings with a fine mist, maintains the all-important humidity around the stems. Mist propagators incorporate a sensor that switches on the mist when required. The most common type of sensor is known as an electronic 'leaf',

ABOVE ***Syringa meyeri* var. *spontanea* 'Palibin', the Korean lilac, is a fine example of a decorative deciduous shrub that can be rooted successfully in a sun tunnel**

which is placed among the cuttings. When it dries out, it switches on the mist until its surface is moist again. Other systems work by spraying the cuttings at timed intervals, but these are not as effective as they do not react to the weather conditions outside the unit.

Mist propagators are usually constructed on an open bench over a base heated by warming cables or, ideally, a heating mat. A wide range of species can be rooted under mist, but this method is regarded as essential for just a very few. We have used a small mist unit for several years with very good results, particularly with *Pinus* and dwarf *Prunus*.

The biggest disadvantage is the management they require to ensure the electronic leaves do not become scaled up, or the compost too wet from over-misting. If you intend to set up your own mist propagator, experiment to find the most suitable settings, and a compost mix that does not become too wet. Under our mist units we use a compost mix comprising 1 part perlite to 1 part peat (by volume), in open-bottomed modular cell trays.

Cuttings rooted under mist need very careful weaning. Some mist controllers have settings to wean the cuttings, reducing the misting gradually over a period of time. If only a few trays or pots are ready to wean, then the simplest solution is to gradually move them away from the mist nozzles over a period of about a week until they are in the normal greenhouse atmosphere.

GREENHOUSES AND POLYTUNNELS

In early autumn, many semi-hardwood evergreen cuttings will root in pots or trays placed on the bench in a greenhouse or polytunnel. If possible, these should be placed well away from doors and windows and, provided they are kept moist, rooting will take place over the winter months and new growth will begin in early to mid-spring. Rooting will be more successful if the cuttings are prevented from freezing either by heating the greenhouse or by covering the pots during cold periods. In bright periods, particularly in early spring, the cuttings must be shaded to prevent them being scorched.

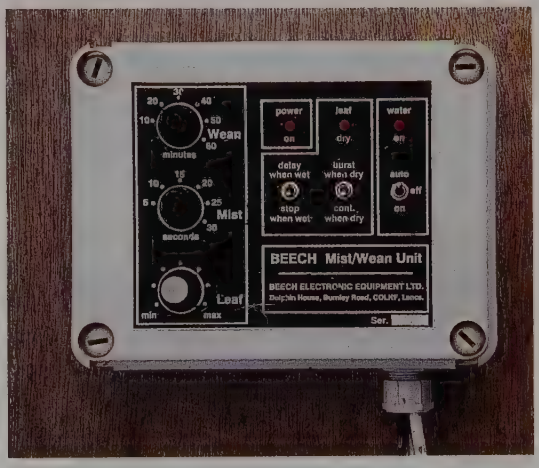
Hardwood cuttings, even those of easier subjects such as willows and many dogwoods, will benefit from being rooted under the protection of a greenhouse where the cuttings can be left in a shady corner in deep trays or pots.

Polytunnels tend to retain more moisture than a greenhouse, and are ideal for rooting cuttings. For many years we rooted all the cuttings for our nursery on the unheated floor of a polytunnel! However, the still, humid atmosphere can cause problems with diseases such as grey mould, particularly in the winter months. Two ways to reduce the risk of grey mould infection are to space the cuttings further apart (to improve air circulation), and to promptly remove dead leaves and dying cuttings.

CUTTINGS IN THE OPEN GROUND

This is really only a practicable option for hardwood cuttings of easy-to-root species, such as *Cornus*, *Salix* and some cane fruits. In mild areas, other shrubs are worth trying outside, particularly if you want large quantities, or you have no other facilities. Choose a sheltered spot, avoiding wet areas and overhanging trees. On heavy soils, simply placing a layer of sand in the bottom of the planting slit will only serve to attract the water – it is vital to improve the surrounding soil so the winter wet can drain away.

ABOVE **A fine mist of water from nozzles keeps the humidity high around cuttings in a mist unit**



ABOVE **A control panel for a mist unit**

ABOVE **Pots of cuttings can be rooted by standing on capillary matting on a greenhouse bench**

CHAPTER 5

The care and growing on of cuttings

Inserting your cuttings is only the first stage towards successful rooting. For many plants the critical stages are the subsequent aftercare and the first potting up. Once cuttings have been inserted, they should be carefully monitored and regularly checked for any signs of disease or pest damage. The first sign of a problem is usually a change in the appearance of the cuttings: the leaf colour may alter, or leaves start to wilt or look 'tired'. If you examine the cuttings every day or two, you should notice these changes and be able to act accordingly.

As well as keeping an eye out for problems, look out for the first signs of

ABOVE Well-rooted cuttings of *Ulmus* x *hollandica* 'Jacqueline Hillier' showing plenty of new growth in spring, and ready for potting up

LEFT It is important to check your cuttings regularly – here, the author examines cuttings for signs of rooting or for any problems

rooting. These are often the opposite of the above changes: the leaves begin to look fresher, the cuttings appear perkier and buds begin to swell.

ROOTING TEMPERATURES

Temperature changes affect the rooting of cuttings in a similar way to normal plant growth. Within reason the warmer the temperature the quicker rooting occurs. The optimum rooting temperature is in the range 15–21°C (60–70°F). During the autumn and winter months in unheated structures, the lower ambient temperatures will slow down the process considerably and significant root development will not begin until the warmer spring temperatures. Many cuttings will even withstand freezing, but in our experience prolonged exposure to frost can damage new growth and cause evergreen cuttings to defoliate. We have found that covering the cuttings with a layer of horticultural fleece during cold spells usually provides enough protection.

If you are using a heated propagator or bed, setting the thermostat as low as 10°C (50°F) will make a significant difference to rooting speed, though setting it within the range 15–21°C (60–70°F) is most beneficial to a great number of plants. Temperatures over 24°C (75°F) can be more detrimental – few cuttings will root above this temperature and only tropical plants really need this degree of bottom heat.

During the spring and summer months the air temperatures inside a propagator or cold frame can rise considerably. Most deciduous cuttings will survive temperatures up to 32°C (90°F) but only at very high levels of humidity – if the air surrounding them is allowed to dry out, caused by draughts or excessive ventilation, they will shrivel very quickly. Even under a shaded structure, temperatures can reach this level very rapidly in the summer, so a good seal to keep moisture inside is particularly important if you are using a sun tunnel or cold frame.

ABOVE **A gentle tug can determine whether a cutting has rooted or not**

ABOVE **Covering pots of cuttings with horticultural fleece can help to protect them in cold weather**

ABOVE **Take care when watering modular trays that every cell becomes moist – it is easy to miss some out**

WATERING CUTTINGS

Once the cuttings have been inserted, they should be thoroughly watered to settle the compost around them. Watering should be done gently to prevent the cuttings being knocked over. We have found that the traditional technique of using an upturned fine rose is very effective.

ABOVE **Always use clean water from a tap for watering cuttings**

The resultant gentle spray of water ensures that the cuttings are not disturbed.

After their initial watering, cuttings should be watered sparingly so the compost is kept just moist and never becomes waterlogged. Pots or trays in propagators will need very little additional water, except during periods of hot weather.

Cuttings must always be watered using water from a tap or a clean storage tank. Rainwater stored in water-butts is not clean, because in running off a roof or other surface it will pick up bacteria, fungal spores and, particularly, mosses and algae. These are then spread over the compost by watering and can result in infection of the cuttings, or the development of a green layer on the surface of the compost in the container. In our experience, the cleanliness of

ABOVE **Shade netting is effective for protecting against sun scorch – this layer is over a sun tunnel from which the polythene has been removed and the rooted cuttings are hardening off**

tap water far outweighs any slight problems that might be caused by any additives in the water. We have always had very hard water and have found that this does not cause a problem even with cuttings of ericaceous plants.

Once cuttings begin to root it is essential that they are not allowed to dry out. Whenever possible, watering should be done in the early morning (giving the new growth a chance to dry before the heat of the sun can scorch it), or early evening (so that there is a chance it will dry out a little, and not remain wet overnight).

PROBLEMS

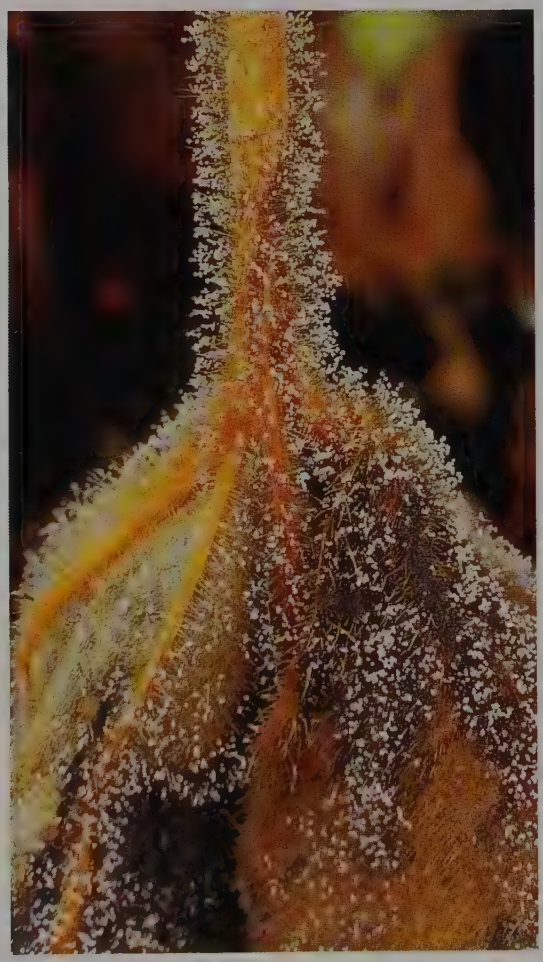
Many potential problems can be avoided by keeping a close watch over your cuttings, maintaining a high degree of cleanliness with tools, containers, compost and propagating structures, and removing any fallen leaves or debris immediately.

SUN SCORCH

During spells of hot weather cuttings are very prone to scorching from the hot sun, particularly in greenhouses and cold frames. In our experience, evergreen cuttings are particularly susceptible. The most effective way to provide shade is to cover the outside of the greenhouse or cold frame, which prevents the temperature inside rising and keeps the cuttings cooler. If this is not practical, then cover the cuttings with one or two layers of shade netting, removing it when the weather becomes dull. Shade netting is preferable to using paint-on shading treatments on the glass as it can easily be removed and replaced when required.

GREY MOULD (*BOTRYTIS CINEREA*)

This is the most visible disease to infect cuttings, producing a characteristic covering of grey mould over the infected areas. The initial



RIGHT ***Botrytis cinerea*** **(grey mould) can spread rapidly in humid conditions and on decaying plant material. Always remove fallen leaves and dead material promptly**

infection often occurs on dead material such as fallen leaves or dropped flowers. The spores can remain dormant in dead plant material in the greenhouse or cold frame for some time. Humid conditions and poor ventilation will encourage the spread of the disease, and as a result it is often more of a problem in the autumn or early spring when ventilators are kept closed for longer, leading to still air around the cuttings.

The prevention of this disease is far easier than the cure. Removing all leaves and flowers as they fall, keeping the propagating area free from plant debris and using clean pots will make a significant difference. Any cuttings showing signs of infection should be removed as soon as they are seen. Treating the greenhouse or cold frame regularly with a disinfectant formulated for outdoor use will help to reduce incidences of infection in all your plants.

WATERLOGGED COMPOST

Newly inserted cuttings are susceptible to a variety of types of root rot (*Pythium*, *Phytophthora*, *Fusarium*). These are all encouraged by wet compost, and can spread very quickly, particularly on heated beds. Symptoms vary from a wilting of newly rooted cuttings to stems becoming blackened and the cutting collapsing. All infected material should be removed and destroyed immediately.

The best cure is prevention; keeping the compost moist but not overwet and using clean containers, can reduce incidences considerably. If you find that waterlogging is a problem with your cuttings then experiment with different compost mixtures, until you find one that suits your set-up.

APHIDS

There are numerous types of aphids, with colours ranging from the more familiar greenfly

LEFT **Aphids will quickly colonize cuttings if not noticed**

and blackfly, through brown and red versions. A bad attack can cause damage to any plant, but the soft growth on newly rooted cuttings is particularly vulnerable.

The first symptom is often a sticky coating on the new growth. This secretion then becomes coated with a sooty mould, turning the leaf surface black and unsightly. If an attack is left unchecked, the shoot tips can become distorted, resulting in reduced growth, and because of the relatively small size of the cuttings even a modest attack can cause their death. Remedial action must therefore be taken at the first sign of an attack.

There are a large number of insecticides on the market that are effective against aphids. The best ones to use are those which are selective and not toxic to beneficial insects, such as ladybirds and bees. Biological control methods can be equally effective if the problem is caught early. A regular spray with soft soap will reduce the problem quickly and help to lessen the stickiness on the leaves.

SLUGS AND SNAILS

Slugs and snails have voracious appetites for young, fresh growth. The damage they cause can range from holes in the edges and centre of leaves of large cuttings to the complete defoliation of smaller ones.

These pests can be readily controlled with the various brands of slug pellets, but non-chemical methods can be just as effective. Sharp grit as a top dressing is unpleasant to the soft bodies of slugs, making a good deterrent. The grit should be placed around the cuttings or along each side of the row in the garden or cold frame to discourage slugs. In greenhouses and cold frames, slug traps baited with liquid such as beer can be very effective.

Sand beds in the greenhouse and cold frames can be treated very effectively with nematodes that infect and kill the slugs. The nematodes can be applied in the spring once the soil temperature rises above 5°C (40°F). They will remain active for up to six weeks if the compost is kept moist.

SCIARID FLIES

These tiny flies can often be seen running over the compost surface, but they are mostly harmless. They are more prevalent on wet compost, so avoid overwatering. Sometimes, the whitish black-headed larvae can be seen in the compost, where they normally feed on decaying plant material. They may cause damage to the base of soft cuttings, and can be controlled by biological means. The best way to keep them at bay is to remove all dead, dying or fallen material regularly.

MOSS AND LIVERWORTS

These can develop on the compost surface of containers of cuttings, particularly those that take several months to root. If left uncontrolled they will form an impenetrable mat, which can reduce the aeration of the compost. With small-unit containers (modular trays) this will cause water to run off the cells causing the compost to dry out. Using water collected from a roof in a water-butt will cause mosses to develop very quickly and should always be avoided. If growth does begin it should be carefully removed as soon as possible to prevent it spreading.

WEEDS

Weeds occur in the best kept garden and weed seeds can creep into greenhouses and cold frames from a variety of sources. Whilst weeds themselves will cause few problems if removed promptly, some will attract pests, such as aphids, that will then rapidly move onto the cuttings. Weeds in sealed sun tunnels can develop very rapidly in the warm humid conditions, swamping the cuttings before they have time to root. To prevent this, always use sterile compost in the tunnel and keep the compost covered at all times before the cuttings are inserted.

ABOVE **A well-rooted *Sempervivum* cutting from a cell tray, ready for potting up**

If weeds are present they can often be seen pressing against the polythene, and the cover should be unsealed and the weeds removed as quickly as possible.

ETIOLATED GROWTH

When shading is left over the cuttings for too long, the new growth can become drawn out, thin and pale, due to the lack of light. Cuttings left in a sealed sun tunnel for too long after they have rooted can be particularly at risk.

If your cuttings become drawn, remove the shading (or tunnel cover) and allow them to harden up before trimming them back to a manageable size, and then leave them for a few weeks before potting them up.

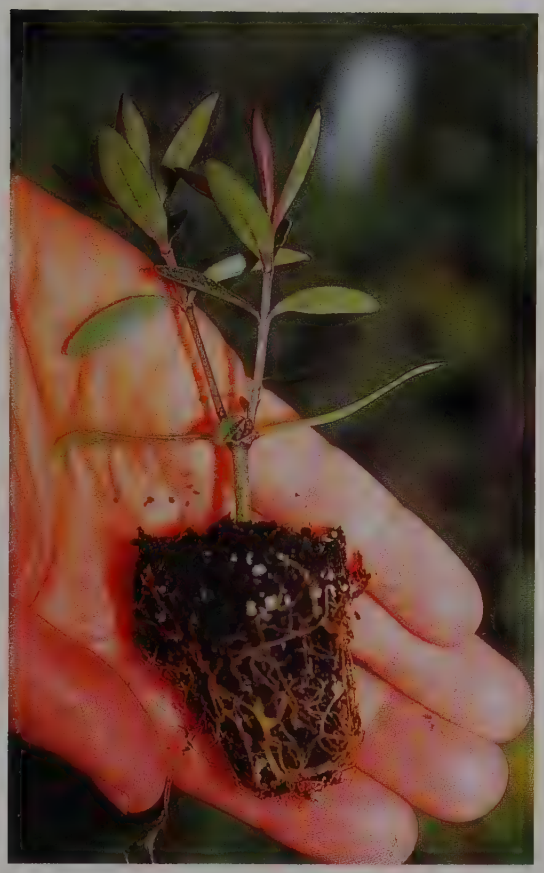
HARDENING OFF CUTTINGS

Once a cutting has rooted successfully it must be gradually weaned from its enclosed and protected environment with 100 percent humidity. The exact method of weaning depends on the structures used.

With a propagator, gradually opening the ventilators or propping up the lid in stages is very effective. With polythene structures such as sun tunnels it is usually easiest to gradually slit the cover over a number of days. A cold frame can have its lid propped up, gradually leaving it open for longer each day.

Once the cuttings have been weaned, they will benefit from a regular feed with a dilute liquid tomato fertilizer. This should be applied on dull days, or in the early evening, to prevent the leaves being scorched.

As the cuttings grow away it is a good idea to pinch out the shoot tips to encourage bushy growth. The sooner this is done the bushier they will become. If you want to produce a large number of plants quickly, the shoot tips can be left to grow slightly larger and then removed and inserted as softwood cuttings. In this way a large number of plants can very quickly be produced from just one initial cutting.

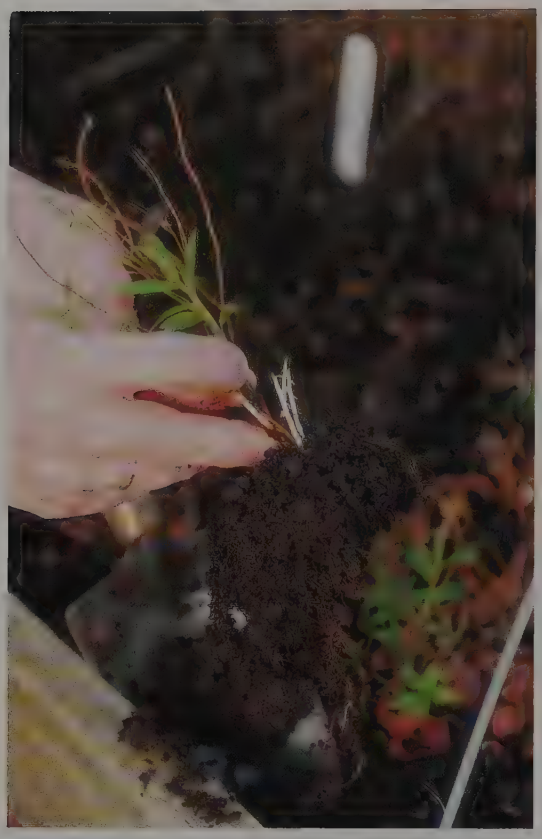


ABOVE **This hebe cutting has developed its own discrete root system in an individual cell in a modular tray**

POTTING UP CUTTINGS

Once the cuttings have developed a strong root system and are beginning to grow new leaves, they are ready to be transferred to, or separated into, individual pots. Timing is important here and the aim should be to pot when the plant is likely to make active root growth, otherwise the roots just sit in compost and can rot very quickly. In practice, this usually means avoiding the period from mid-autumn to late winter. Overwintered cuttings are best potted in the early spring as they begin to show new growth.

Having successfully got your cuttings rooted, it is important to ensure they are handled carefully at this stage to allow them to grow away rapidly. Choose good quality compost for



ABOVE **Lift rooted cuttings carefully from a sun tunnel using a trowel. This *Spiraea* has plenty of root growth**

potting up. The incorporation of a slow release fertilizer (always at the manufacturer's recommended rate) is a good idea, especially for shrub cuttings.

Follow this procedure for potting up your rooted cuttings:

1. Carefully lift cuttings growing in a cold frame or sun tunnel using a trowel. Remove any excess loose compost but leave any that is attached to the roots. Tip pots or trays of cuttings out onto the potting bench and loosen the compost by gently banging the rootball on the bench – this should loosen the compost around the cuttings and allow you to carefully tease them apart. If the roots have become very tangled they can be cut apart with sharp secateurs – this will cause less damage than tearing them. Again, do not remove compost that is firmly adhered to the roots.
2. Cuttings that have been growing for some time, such as those from cold frames or sun tunnels, often develop substantial root systems. Fibrous root systems are best trimmed back by up to half prior to potting as this will encourage them to branch out and ensure that they will fit into a pot without being squashed, or wound around the sides of the pot. This is unnecessary if you are planting them straight out into the garden. Plants with a small number of thick roots, such as *Forsythia* and *Syringa*, need to be handled carefully and only the ends trimmed lightly, if necessary.
3. Fill a pot about one-third full of potting compost; for most cuttings a 9cm (3½in) pot will be adequate. Hold the cutting in the pot so the roots are just touching the compost and the stem is at the same depth as before, then backfill around the roots with compost until it is level with the surface of the pot. Shaking the cutting gently during the process will help to settle the roots, but if the cutting remains loose firm around it GENTLY. Do not press the compost down hard, or you will exclude air and even damage the new roots.
4. Water the newly potted cuttings thoroughly to settle the compost. Subsequently, water them carefully, keeping the compost moist but not wet as the soft new roots are vulnerable to drying out, and equally vulnerable to lack of air caused by waterlogging.
5. If the cuttings have put on a lot of leafy growth they can be trimmed back by up to half. This will reduce the amount of leaf that is taking up water while the roots are becoming established in their new compost. Even with smaller cuttings it is a good idea to pinch out the shoot tips as this will encourage bushy growth from the base of the new plant.
6. Place the potted cuttings in a shady spot (such as a shaded greenhouse or cold frame, or outside in summer) until they are well

ABOVE **Use a good quality potting compost for potting up your rooted cuttings**

RIGHT **Tip whole pots of cuttings out completely – don't dig them out one by one. These fuchsias can be carefully separated and potted up. Note that the roots are just ready, without having become entangled**

established and growing away vigorously. If you have not added slow release fertilizer they will benefit from a regular feed with a balanced liquid fertilizer.

Hardwood cuttings that have been rooted in the garden are usually best left in place until the following autumn. Once they have lost their leaves, lift them carefully – using a border spade – and then plant them directly into their final growing positions. If you want to grow the cuttings on in pots, it is better to root them in pots in the first place, so the root systems remain a manageable size.

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CHAPTER 6

Perennials from cuttings

You can increase many herbaceous and other perennials from cuttings. Propagation by cuttings is the best way to perpetuate named hybrids or particularly good coloured forms. It is also a valuable way to insure against winter losses – taking cuttings in late summer and overwintering them in frost-free conditions.

Softwood cuttings, using the tips of new shoots, are taken in spring or summer. Most herbaceous perennials produce new growth from a woody base in spring, and these shoots can be removed and used as cuttings. In some cases, a heel of basal wood is removed with the cutting and trimmed to leave a neat edge. During summer the tips of non-flowering shoots can be taken. Both of these are treated as softwood cuttings, and can be potted up the same year.

During late summer, you can take semi-hardwood cuttings of plants such as *Diascia* and *Penstemon*, which may succumb in a hard or wet winter. Keep the cuttings in a frost-free greenhouse over winter, and pot them up in spring. This method is also used for half-hardy perennials, such as *Osteospermum*.

Other perennials include alpines and some herbs, which can also be increased by cuttings. These may be softwood or semi-hardwood, and in some alpines individual rosettes may be treated as cuttings.

A large number of perennials are usually propagated by division, but if your plant is too small for lifting and dividing or you don't want to disturb it, then take cuttings to bulk up the number of plants instead. Examples include *Ajuga* (bugle), *Helianthus* (sunflower) and *Lamium* (deadnettle). Some perennials dislike being divided and do not root from stem cuttings. You can increase these by root cuttings during late autumn and winter.

EASY-TO-ROOT PERENNIALS

Dianthus
Geranium
Lamium
Osteospermum
Sedum
Sempervivum

MORE CHALLENGING PERENNIALS

Campanula (shoots often fragile)
Pulsatilla (root cuttings – plants dislike disturbance)
Romneya (root cuttings – can be difficult, take a long time to shoot)
Tanacetum (soft, velvety leaves can easily rot)

RANGE OF PERENNIALS TO GROW FROM CUTTINGS

All are hardy perennials unless stated otherwise. Cuttings may be inserted in pots, trays or cell trays of compost and placed in a propagator, cold frame or greenhouse, as briefly described for each plant.

NAME: *ACANTHUS* (BEAR'S BREECHES)

Type of cutting: Root
Timing: Late autumn to late winter
Method: Place 3cm (1in) sections vertically in pots in cold frame
Notes: Do not dig up the whole plant as they dislike disturbance; just scrape the soil away around the base and remove a few roots this way

NAME: *ACHILLEA* (MILFOIL, YARROW)

Type of cutting: Softwood
Timing: Spring or early summer
Method: 3–8cm (1–3in) cuttings in cold frame or propagator
Notes: Grey-leaved forms are better rooted in the late summer when the stems have firmed up. They are best rooted on a shady greenhouse bench, taking care not to let the foliage get overwet

NAME: *AJUGA* (BUGLE)

Type of cutting: Softwood
Timing: Mid to late summer
Method: Take stem tips and place in cold frame
Notes: Division is the usual method of increase, but taking cuttings is useful if your clump is too small

RIGHT **Although *Ajuga reptans* is easily increased by division, cuttings are an option if your plant is small**

NAME: *ANAPHILIS* (PEARL EVERLASTING)

Type of cutting: Softwood
Timing: Mid to late spring
Method: 5–8cm (2–3in) cuttings from fresh basal shoots in cold frame or propagator
Notes: Dense clusters of new shoots are produced at the base in spring

NAME: *ANCHUSA* (ALKANET)

Type of cutting: Root
Timing: Mid autumn or late winter
Method: Place 5cm (2in) sections vertically in pots in cold frame – use thick sections of root
Notes: For propagating named hybrids

NAME: *ANEMONE* (WINDFLOWER/ JAPANESE ANEMONE)

Type of cutting: Root
Timing: Winter
Method: Lay 5–10cm (2–4in) sections horizontally in trays in cold frame
Notes: Anemones such as *A. hupehensis* and *A. x hybrida* have thin roots

NAME: *ANTHEMIS*

Type of cutting: Softwood
Timing: Spring
Method: 5–8cm (2–3in) cuttings from basal shoots, setting them in a cold frame, or using bottom heat in propagator
Notes: Clusters of shoots are produced at the base of the plant in spring

NAME: *ARTEMISIA DRACUNCULUS* (TARRAGON)

Type of cutting: Softwood
Timing: Mid to late summer
Method: 5–10cm (2–4in) long cuttings, inserted into a cold frame
Notes: French tarragon, the fine-flavoured culinary perennial herb, can also be increased by division in spring; only the coarser-flavoured Russian tarragon should be raised from seed

ABOVE **It is easy to increase tarragon (*Artemisia dracunculus*) by cuttings taken in summer**

NAME: *BRUNNERA*

Type of cutting: Root
Timing: Late autumn to late winter
Method: Place 8cm (3in) sections horizontally in trays in cold frame
Notes: Roots resemble black bootlaces

NAME: *CAMPANULA* (BELLFLOWER)

Type of cutting: Softwood
Timing: Mid to late spring
Method: 3–5cm (1–2in) cuttings from basal shoots or stem tips in heated propagator or cold frame
Notes: Use short cuttings and take care as the shoots are fragile and break easily; slug attacks can devastate cuttings

NAME: *CRAMBE CORDIFOLIA* (SEA KALE)

Type of cutting: Root
Timing: Winter
Method: Place 5cm (2in) pencil-thick sections vertically in pots in cold frame
Notes: Better than disturbing the plant by division. Plant cuttings out in spring when new shoots are growing strongly

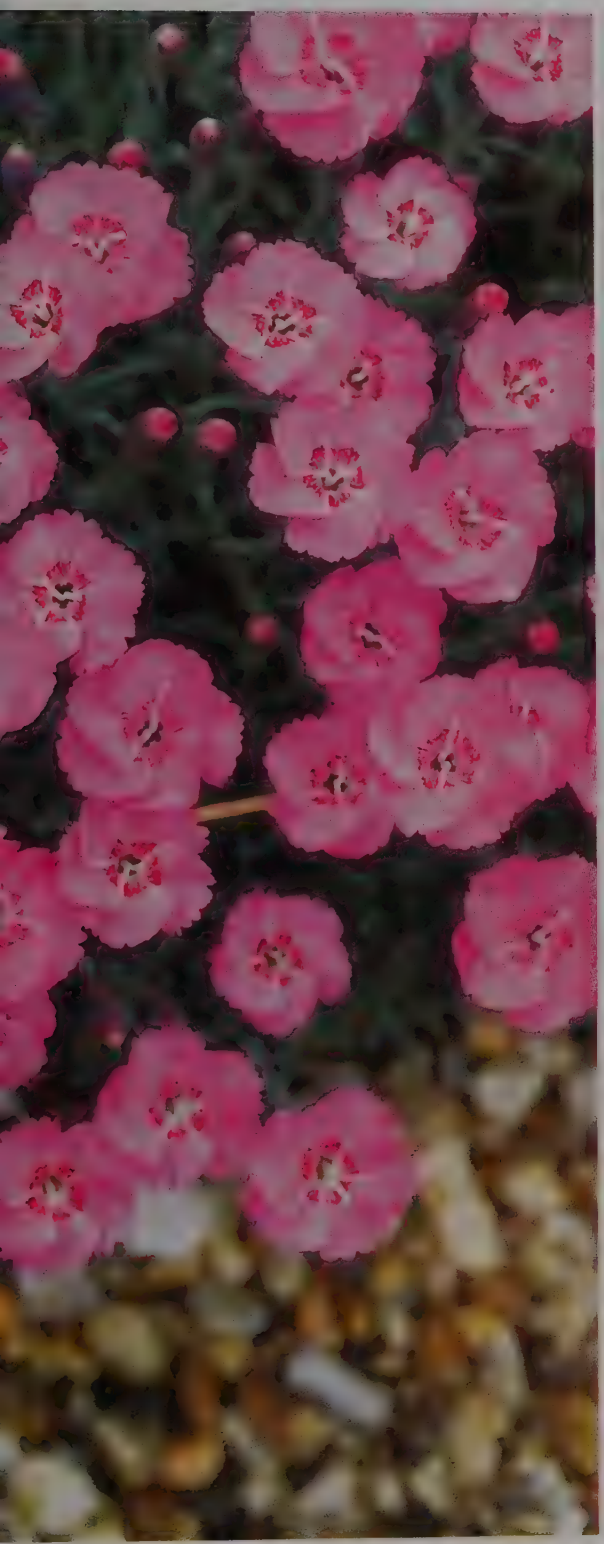
NAME: *DELPHINIUM*

Type of cutting: Softwood
Timing: Early spring
Method: 8–10cm (3–4in) cuttings of fresh basal shoots in cold frame or propagator
Notes: Named cultivars and selected colours must be propagated by cuttings. Slug attacks can devastate cuttings

NAME: *DENDRANTHEMA* (CHRYSANTHEMUM)

Type of cutting: Softwood
Timing: Spring
Method: 8cm (3in) cuttings from basal shoots in cold frame
Notes: Produces sturdy new shoots from a woody base in spring. In cold areas, lift the rootstocks during late autumn and keep them in boxes of moist peat in the greenhouse. Cuttings can then be taken from new growth in the early spring

BELOW ***Dianthus* 'Emile Pare' is an old-fashioned pink that has been perpetuated down the years by cuttings**



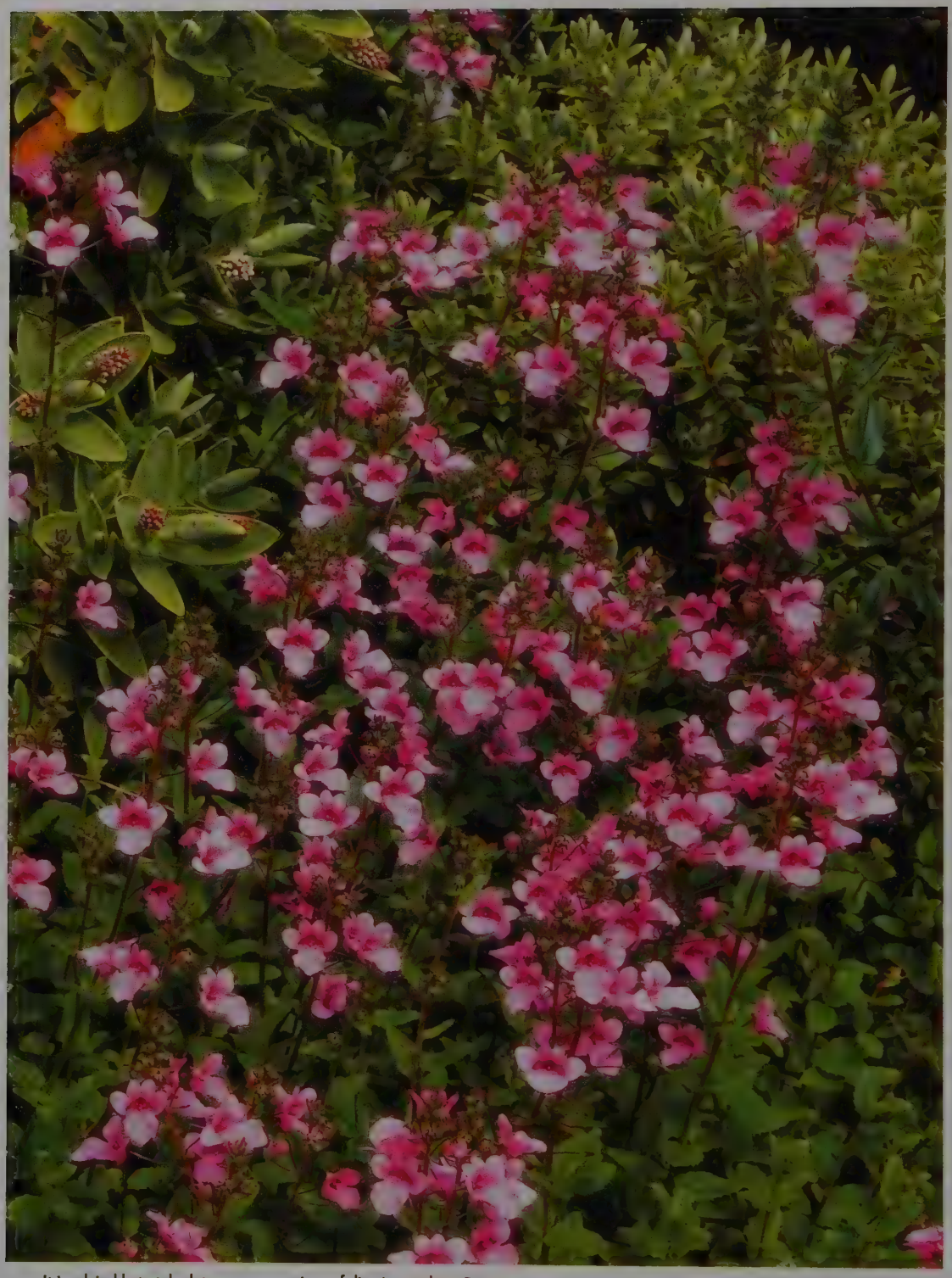
NAME: *DIANTHUS* (PINK; PERPETUAL-FLOWERING CARNATION)

Type of cutting: Pipings (pinks) or softwood (carnations)
Timing: Early to mid-summer
Method: For pinks, pull the shoot tips away at a joint, trim immediately below a node and insert in pots in a cold frame or propagator. Choose non-flowering shoots that are closely jointed. Perpetual-flowering carnations can be rooted successfully at any time with bottom heat of 18–20°C (65–68°F). Use healthy side shoots 10–12cm (4–5in) in length
Notes: Pipings root more quickly with the use of rooting hormone, usually in 3–4 weeks. Mist lightly each day with a hand sprayer for 10–14 days if possible

NAME: *DIASCIA*

Type of cutting: a) Softwood or b) semi-hardwood
Timing: a) Spring or b) late summer
Method: a) 3–5cm (1–2in) tip cuttings in propagator or pots in the cold frame, or b) 5–8cm (2–3in) semi-ripe stem cuttings in free-draining compost in pots in the cold frame; pot up when the cuttings have rooted and overwinter under cover
Notes: Some are half-hardy perennials. It is advisable to take late summer cuttings of less reliably hardy diascias, such as the cultivar 'Ruby Field', to insure against winter loss

LEFT *Dianthus* 'Whatfield Joy' is a more modern alpine pink



ABOVE It is advisable to take late summer cuttings of diascias, such as *Diascia rigescens*, to insure against winter loss

ABOVE *Erodium* x *variabile* 'Bishop's Form' can be propagated by taking short shoots as cuttings

NAME: *DICENTRA* (BLEEDING HEART)

Type of cutting: a) Softwood or b) root
Timing: a) Early to mid-spring or b) late autumn to early spring
Method: a) Short basal shoot cuttings in cold frame or b) 5cm (2in) root sections vertically in pots in cold frame
Notes: Handle roots carefully as they are fragile. Flowering takes one year from softwood cuttings, two years from root cuttings

NAME: *ECHINACEA* (PURPLE CONE FLOWER)

Type of cutting: Root
Timing: Late winter
Method: Place 5–10cm (2–4in) sections vertically in pots of peat and sand mixture in cold frame
Notes: This method is particularly useful for propagating named varieties. Remove roots carefully as plants dislike disturbance

NAME: *ERIGERON* (FLEABANE)

Type of cutting: Softwood
Timing: Early summer
Method: Take 5–8cm (2–3in) long tip cuttings, inserting them into a cold frame
Notes: Use for selected named forms

NAME: *ERODIUM* (HERONSBILL)

Type of cutting: a) Semi-hardwood or b) root
Timing: a) Late summer or b) winter
Method: a) Short cuttings with a small piece of basal wood in pots in cold frame or propagator, or b) 3–5cm (1–2in) pieces of root placed vertically in pots in the cold frame
Notes: Shoots are very short, so they can be pulled off gently with a piece of basal wood attached and neatly trimmed. With the smaller forms we have had good results using small, branched sections with two to three small shoots on a stem

ABOVE ***Geranium cinereum*** **'Laurence Flatman', one of many cranesbills that can be increased from root cuttings**

NAME: *ERYSIMUM* (PERENNIAL WALLFLOWER)

Type of cutting: Semi-hardwood
Timing: Mid to late summer
Method: 5–8cm (2–3in) cuttings in the greenhouse or cold frame
Notes: Remove any flower buds present

NAME: *EUPHORBIA* (SPURGE)

Type of cutting: Softwood
Timing: Mid to late spring (basal) or mid-summer (stem tips)
Method: 8–12cm (3–5in) cuttings of fresh basal shoots or 3–5cm (1–2in) tip cuttings, both in cold frame
Notes: Wear gloves, as the milky sap is an irritant. Seal the stem by passing the cut end through a flame or dipping it in charcoal

LEFT **Euphorbias must be handled with care as the milky sap from cut stems is an irritant**

NAME: *GERANIUM* (CRANESBILL)

Type of cutting: Root
Timing: Late autumn to winter
Method: Insert 3–5cm (1½–2in) sections vertically in pots
Notes: These propagate very easily from root cuttings. Good results can be obtained if necessary at most times of the year

ABOVE **Half-hardy osteospermums are best propagated each summer from cuttings**

NAME: *GYPSOPHILA* (BABY'S BREATH, CHALK PLANT)

Type of cutting: Softwood
Timing: Mid to late spring (basal) or mid-summer (stem tips)
Method: 5–8cm (2–3in) cuttings from new basal shoots (can be taken with a heel of wood and trimmed) or 8cm (3in) stem tips in cold frame or heated propagator
Notes: Overwinter summer cuttings in the cold frame and plant out in spring

NAME: *HELENIUM* (SNEEZEWORT)

Type of cutting: Softwood
Timing: Mid to late spring
Method: Take 8cm (3in) stem tip cuttings, and insert them in a cold frame
Notes: It is advisable to take cuttings of named cultivars as seed-raised plants can be variable

NAME: *HELIANTHUS* (SUNFLOWER)

Type of cutting: Softwood
Timing: Early to mid-spring
Method: 5–8cm (2–3in) cuttings, inserting into a cold frame
Notes: Basal shoots can usually be teased away from the main plant with small roots already attached (Irishman's cuttings). Pot these up and grow them on for a few weeks before planting out

NAME: *IBERIS* (PERENNIAL CANDYTUFT)

Type of cutting: Semi-hardwood
Timing: Summer
Method: 3–5cm (1–2in) cuttings from stem tips (may be taken with a heel) in cold frame
Notes: Propagate named hybrids this way; species are easier from seed

ABOVE **Penstemons are not always hardy, so take a few cuttings each year to overwinter**

NAME: *LAMIUM* (DEADNETTLE)

Type of cutting: Softwood
Timing: Mid-summer
Method: 5–8cm (2–3in) stem tip cuttings in cold frame
Notes: Use cuttings if you don't want to disturb the whole plant by dividing it up

NAME: *LUPINUS* (LUPIN)

Type of cutting: Softwood
Timing: Spring or early summer
Method: 8–12cm (3–5in) cuttings from fresh basal shoots or non-flowering sideshoots in sandy compost in cold frame or slight heat in propagator
Notes: Take cuttings for selected hybrids or to propagate particularly good colour forms

NAME: *MONARDA*

Type of cutting: Softwood
Timing: Mid to late spring
Method: 5–8cm (2–3in) cuttings from fresh basal shoots produced in spring
Notes: Use cuttings for named hybrids and selected colour forms

NAME: *NEPETA* (CATMINT)

Type of cutting: Softwood
Timing: Spring or summer
Method: 3–5cm (1–2in) stem tip cuttings in pots in propagator or cold frame
Notes: Essential for named hybrids; species can be raised from seed

NAME: *OSTEOSPERMUM*

Type of cutting: Semi-hardwood
Timing: Mid to late summer
Method: 8–12cm (3–5in) cuttings of non-flowering shoots in pots in the greenhouse
Notes: Take cuttings each year as these are only half-hardy in all but the warmest areas

NAME: *PENSTEMON*

Type of cutting: Softwood or semi-hardwood
Timing: Early autumn
Method: 5–8cm (2–3in) soft tip cuttings in pots in propagator or 8–10cm (3–4in) semi-ripe cuttings in cold frame or greenhouse. Overwinter in the greenhouse
Notes: It is advisable to take cuttings each year to insure against winter losses, as penstemons are not always totally hardy

NAME: *PERSICARIA*

Type of cutting: a) Softwood or b) semi-hardwood
Timing: a) Spring or b) mid-summer
Method: a) 5cm (2in) cuttings from fresh basal shoots or b) 3–5cm (1–2in) semi-ripe stem cuttings, both in cold frame
Notes: Some species can be divided, but cuttings are suitable for *Persicaria affine* and *P. vaccinifolia*

LEFT **Persicarias can be divided, but if your plant is very small, take a few cuttings instead**

ABOVE **Alpine phloxes can be increased by cuttings in spring**

NAME: *PHLOX*

Type of cutting: a) Softwood (rock garden types) or b) root (*P. paniculata* cultivars)
Timing: a) Spring or b) winter
Method: a) 2–4cm (¾–1½in) tip cuttings in sandy compost in propagator or cold frame, or b) 8cm (3in) sections of thin root placed horizontally in trays in a cold frame
Notes: Propagating *Phlox paniculata* cultivars by root cuttings can overcome the problem of eelworm, resulting in healthier plants (but do not use this method for variegated forms as they will revert to green)

NAME: *PHUOPSIS*

Type of cutting: Semi-hardwood
Timing: Summer
Method: Take 5–10cm (2–4in) stem cuttings, inserted in a cold frame
Notes: You can also remove shoots with small roots already attached – take these from around the edges of the clump, pot up and grow on in a cold frame

RIGHT ***Phuopsis stylosa* roots readily from cuttings**

ABOVE **Selected forms of candelabra primulas can be propagated by means of root cuttings**

ABOVE **Pulsatillas can be propagated from root cuttings, although it is best not to disturb the plant more than necessary**

NAME: *PHYSOSTEGIA* (OBEDIENT PLANT)

Type of cutting: Softwood
Timing: Summer
Method: 8–10cm (3–4in) stem tip cuttings in pots in propagator or cold frame
Notes: Overwinter cuttings under cover and plant out in spring

NAME: *POTENTILLA* (CINQUEFOIL – HERBACEOUS TYPES)

Type of cutting: Softwood
Timing: Mid-spring
Method: 5–8cm (2–3in) cuttings from fresh basal shoots in pots in cold frame
Notes: Use cuttings rather than seed or division for named hybrids that tend to be short-lived

ABOVE ***Rudbeckia*** **cultivars will root from softwood cuttings in spring**

NAME: *PRIMULA* (PRIMROSE, PRIMULA)

Type of cutting: Root
Timing: Late autumn to late winter
Method: Place 5cm (2in) sections horizontally in trays in cold frame or greenhouse
Notes: Suitable for *Primula denticulata* (drumstick primula). The thin roots are easier laid flat rather than inserted vertically. Selected forms of many other *Primula* species can also be propagated this way

NAME: *PULSATILLA* (PASQUE FLOWER)

Type of cutting: Root
Timing: Late winter
Method: Place 3cm (1in) sections vertically in pots of compost in a cold frame or greenhouse. If only thin sections are available, lay these horizontally on the surface of trays
Notes: As pulsatillas resent root disturbance, the cuttings are best taken by carefully removing soil from around part of the mother plant and then just removing a few roots. Alternatively, use young pot-grown plants

ABOVE *Saponaria ocymoides* can be increased from early summer cuttings

NAME: *ROMNEYA* (CALIFORNIAN POPPY)

Type of cutting: Root
Timing: Late winter
Method: Place pencil-thick roots of 5–10cm (2–4in) in length, vertically in pots
Notes: The root cuttings are prone to rotting if they become too moist. Gentle bottom heat will increase the success rate. Pot up several months after the first shoots emerge

NAME: *RUDBECKIA* (CONEFLOWER)

Type of cutting: Softwood
Timing: Early to mid-spring
Method: Take 5–8cm (2–3in) cuttings, inserted into a cold frame
Notes: If the mother plants are well established, basal shoots can usually be teased away with small roots already attached (Irishman's cuttings). Pot these up and grow them on for a few weeks before planting out

NAME: *SAPONARIA* (SOAPWORT, TUMBLING TED)

Type of cutting: Softwood
Timing: Early summer
Method: Take 5–10cm (2–4in) tip cuttings, in pots in cold frame
Notes: Taking cuttings of *Saponaria* results in less variable plants than raising from seed; essential for named alpine types

NAME: *SAXIFRAGA* (SAXIFRAGE)

Type of cutting: Individual rosettes
Timing: Early spring (when new growth starts) or summer (after flowering)
Method: Remove individual non-flowering rosettes with a short stem if possible and treat as if they were cuttings, inserting them in a propagator or cold frame. Use John Innes compost mixed with sand or chick grit
Notes: These 'cuttings' are tiny and fiddly to prepare, needing fine compost to hold them in place. Remove the lower leaves with great care. If roots are present on the rosettes insert these carefully and treat as normal cuttings until new growth is visible

NAME: *SCROPHULARIA* (FIGWORT)

Type of cutting: Softwood
Timing: Mid to late spring (basal) or early summer (tip)
Method: Take 5–8cm (2–3in) long cuttings from fresh basal shoots, or soft tip cuttings in pots in cold frame
Notes: This form of propagation is essential for the variegated form, which is usually the only type grown as an ornamental

LEFT **Individual rosettes of saxifrages can be taken as cuttings, although they need patience as they are so small**

ABOVE **Cuttings of sedums, such as *Sedum spurium* 'Purpurteppich', are very easy to root**

NAME: *SCUTELLARIA* (SKULLCAP)

Type of cutting: Softwood
Timing: Spring or early summer
Method: 3–5cm (1–2in) cuttings in pots in propagator or cold frame
Notes: Many species are easily raised from seed, but use cuttings for increasing named cultivars or selected colour forms

NAME: *SEDUM* (STONECROP)

Type of cutting: Softwood
Timing: Early spring to mid-summer
Method: Take 2–12cm (¾–5in) soft tip cuttings (the precise length depending on the species or hybrid); insert them into pots in either a cold frame or greenhouse
Notes: Generally, alpine and border types are very easy to root. Single cuttings can even be placed straight into small individual pots to root, rather than several to one pot, to save one stage of potting up

NAME: *SEMPERVIVUM* (HOUSELEEK)

Type of cutting: Individual rosettes
Timing: Spring to autumn, although they will root at any time
Method: Detach individual rosettes (offsets) and press them lightly into sharply drained compost in pots or modules; place them in either a cold frame or cold greenhouse
Notes: Rosettes may already have roots starting to grow, so they can be put straight into individual small pots. The rosettes are very prone to rotting off and should be kept only just moist until they are well established

ABOVE **Individual rosettes, or offsets, of sempervivums can be detached and rooted, or they may even have already formed roots**

NAME: *STACHYS*

Type of cutting: Semi-hardwood
Timing: Summer
Method: Take 5–8cm (2–3in) long cuttings; use sharply drained compost, and insert in pots in a cold frame or greenhouse
Notes: The cuttings should be kept in a well-ventilated atmosphere to prevent grey mould developing on the soft, velvety foliage prior to rooting

NAME: *TANACETUM*

Type of cutting: a) Softwood or b) semi-hardwood
Timing: a) Spring or b) summer
Method: For both, insert 3–8cm (1–3in) cuttings in sharply drained compost in pots in a cold frame or greenhouse
Notes: The cuttings should be kept in a well-ventilated atmosphere to prevent grey mould developing on the foliage prior to rooting

NAME: *VERBASCUM*

Type of cutting: Root
Timing: Late winter
Method: Place 4–5cm (1½–2in) sections horizontally in trays of sharply drained compost in cold frame
Notes: Use thicker root sections from nearest the plant rather than the thin ends of roots

NAME: *VERONICA* (SPEEDWELL)

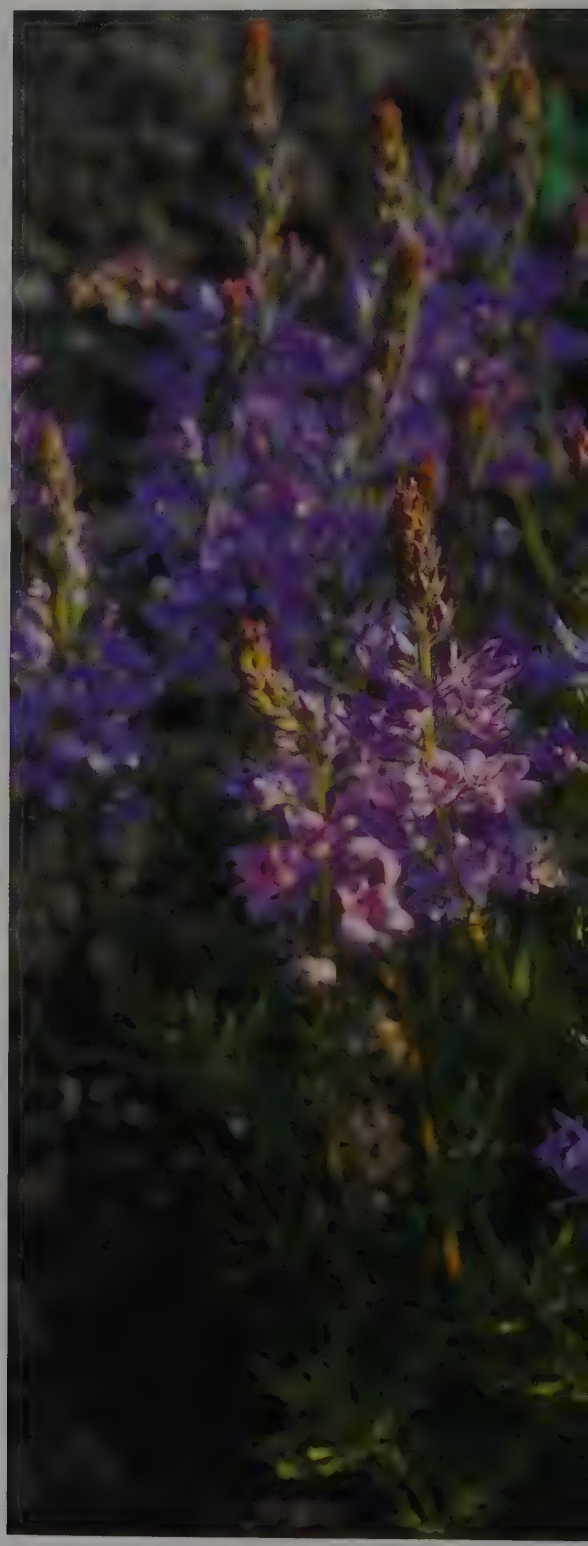
Type of cutting: a) Softwood or b) semi-hardwood
Timing: a) Spring or b) mid to late summer
Method: a) 3–8cm (1–3in) soft tip cuttings in pots in propagator, or b) take 5–10cm (2–4in) semi-ripe cuttings to overwinter under cover
Notes: Overwintered cuttings will often shoot from beneath the compost in spring even when the old shoots look dead (so be patient!)

NAME: *VERONICASTRUM*

Type of cutting: a) Softwood or b) semi-hardwood
Timing: a) Spring or b) mid-summer
Method: For both, insert 5–10cm (2–4in) cuttings in pots in cold frame or greenhouse
Notes: Use this method for named cultivars rather than sowing seeds

NAME: *VIOLA*

Type of cutting: Softwood
Timing: Mid-summer to early autumn
Method: 3–5cm (1–2in) cuttings from non-flowering shoots in pots in a shaded cold frame or greenhouse
Notes: Alternatively, cut plants down and cover with compost or peat – fresh basal shoots can be used as cuttings, or often will form their own roots in situ and can be removed and potted up



RIGHT ***Veronica pinnata*** **'Blue Eyes' can be propagated by cuttings in spring or summer**

CHAPTER 7

Shrubs from cuttings

Taking cuttings is generally the simplest way to propagate most shrubs, ensuring that the characteristics of the parent plant are retained. It is therefore suitable for hybrids and named cultivars, including variegated forms, as well as species.

You can take cuttings at different stages of growth, though some shrubs root better using one type of cutting than another. Softwood cuttings are taken from the new growth in late spring or early summer, usually requiring bottom heat and high humidity, and are really only worth using for easy-to-root deciduous shrubs. They take just a few weeks to root.

EASY-TO-ROOT SHRUBS
Buddleja
Cornus
Deutzia
Euonymus – evergreen
Kerria
Santolina

MORE CHALLENGING SHRUBS
Berberis
Chimonanthus
Garrya
Photinia
Rhamnus
Syringa

Semi-hardwood cuttings – in which the current season's shoots just begin to ripen, or harden – can be used for a wide range of deciduous shrubs (taken from mid to late summer) and evergreen shrubs (taken from early to mid-autumn). These take from four to six months or even more to root, though bottom heat can reduce this period of time.

Fully ripened shoots can be used as hardwood cuttings, taken from mid-autumn and throughout winter, though deciduous shrubs are best propagated just after leaf fall. Those inserted into a cold frame take four to six months to root, whilst those in the open ground need to be left until the following autumn before transplanting or potting up.

A RANGE OF SHRUBS TO GROW FROM CUTTINGS

NAME: *ABELIA*

Type of cutting: a) Softwood or b) semi-hardwood
Timing: a) Early summer or b) mid to late summer
Method: a) 5–10cm (2–4in) cuttings in propagator or b) 10–15cm (4–6in) cuttings, with the soft tips removed, in a cold frame
Notes: Use rooting hormone. Protect late summer cuttings from frost

NAME: *ABELIOPHYLLUM*

Type of cutting: Semi-hardwood
Timing: Mid to late summer
Method: 10–15cm (4–6in) shoots in propagator at 18°C (65°F)
Notes: Pot up when rooted and keep young plants under cover for the first winter, planting out late spring the following year

NAME: *ARTEMISIA*

Type of cutting: Semi-hardwood
Timing: Mid to late summer
Method: Take cuttings with a heel and place in sandy compost in a cold frame
Notes: Needs care to prevent the foliage from becoming too wet and rotting off. Ventilate well as soon as rooting has begun

NAME: *AUCUBA*

Type of cutting: a) Semi-hardwood or b) hardwood
Timing: a) Early to mid-autumn or b) late autumn
Method: 10–15cm (4–6in) cuttings, using either young shoots from near the base of the plant or shoots taken with a heel, and place in a cold frame (both types) or sheltered spot outside (hardwood)
Notes: Rooting hormone is not required. Feed the cuttings regularly once they have rooted and pot them on as soon as possible to prevent the growth from becoming restricted

RIGHT ***Berberis thunbergii*** **'Red Pillar' is a deciduous cultivar**

NAME: *AZALEA*

Type of cutting: a) Softwood or b) semi-hardwood
Timing: a) Early summer or b) mid-summer
Method: a) 10cm (4in) soft tips of deciduous types in peaty compost in propagator at 20°C (68°F). b) For evergreen azaleas, take 10cm (4in) semi-ripe shoots and keep in the same conditions
Notes: To ensure better rooting, use rooting hormone. Deciduous types are not easily rooted; evergreen ones are more likely to be successful. Take care when potting up the cuttings as the root system is very brittle when young and easily separates from the stem

NAME: *BERBERIS* (BARBERRY) – EVERGREEN

Type of cutting: Semi-hardwood
Timing: Early to mid-autumn
Method: 10–15cm (4–6in) nodal cuttings (may be taken with a heel). Use shorter lengths for dwarf forms. Place in a well-sealed cold frame or propagator
Notes: Remove the lower leaves and spines with a pair of sharp secateurs; dip the cuttings in rooting hormone powder or liquid. Cuttings of *Berberis* are prone to rotting at the base, so the addition of extra sand, grit or bark to the compost can be beneficial

NAME: *BERBERIS* (BARBERRY) – DECIDUOUS

Type of cutting: a) Semi-hardwood or b) hardwood
Timing: a) Early summer or b) early to mid-autumn
Method: a) Take cuttings with a heel or piece of old wood attached, or use nodal cuttings. Use 5–10cm (2–4in) lengths for dwarf forms, 15–20cm (6–8in) lengths for others. Place in peaty compost in a cold frame and cover with plastic to keep out draughts. Pot up in early autumn or leave until early spring. b) Follow the same procedure for hardwood cuttings, which will be ready for potting the following spring
Notes: Deciduous *Berberis* can be quite difficult to root – remove spines from the base of cuttings and use rooting hormone

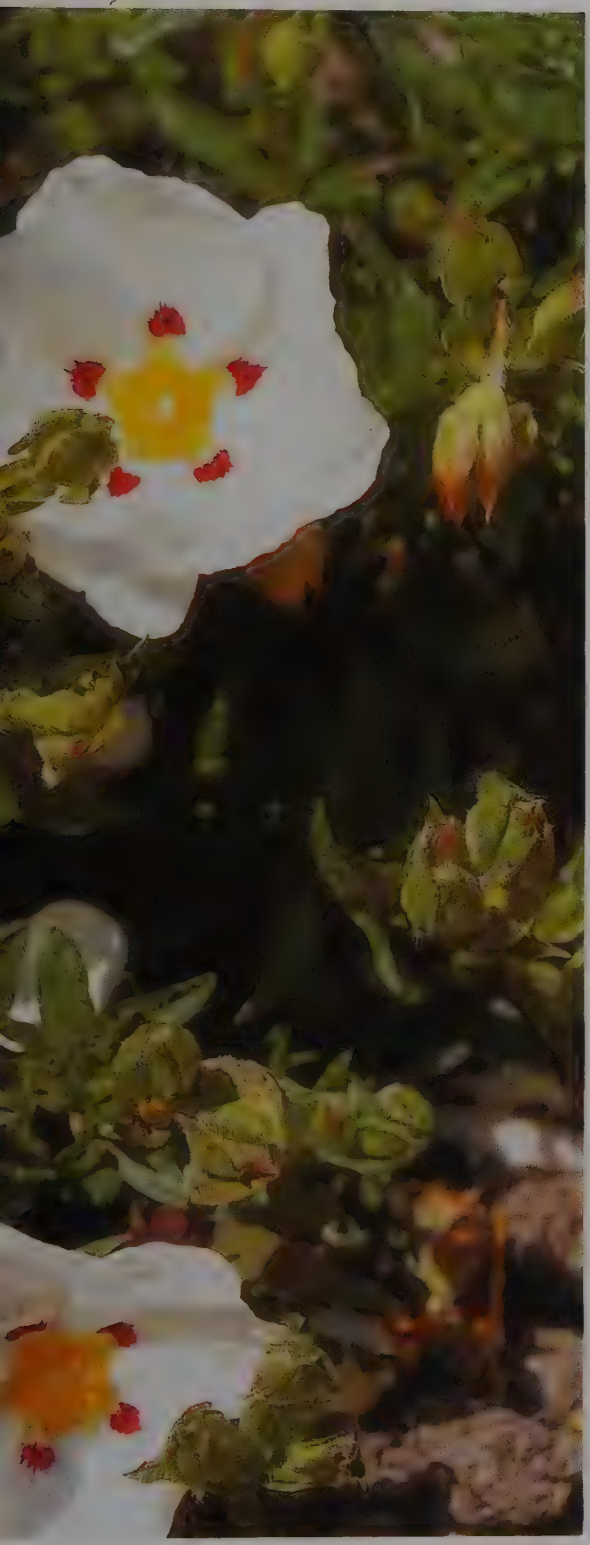
NAME: *BUDDLEJA*

Type of cutting: a) Softwood or b) hardwood
Timing: a) Spring or b) late autumn
Method: a) 10cm (4in) cuttings in a warm propagator (rooting in 3–4 weeks), or b) 20–25cm (8–10in) one-year-old shoots in a cold frame or in a sheltered position outside
Notes: Hardwood cuttings root easily, within 3–4 months, so they can be rooted in their final position outside if you wish – insert two-thirds of their length. Cuttings will grow away very rapidly and should be potted on as soon as possible to prevent any check to growth

NAME: *BUXUS* (BOX)

Type of cutting: a) Semi-hardwood or b) hardwood
Timing: a) Mid to late summer or b) autumn
Method: For both types, take 7–10cm (3–4in) long cuttings, inserting them into a cold frame or sheltered spot outside
Notes: Remove the soft tips from cuttings. If the cuttings are well spaced they can be left *in situ* for a season and then planted directly into their final positions

RIGHT ***Ceratostigma plumbaginoides***



NAME: *CALLICARPA*

Type of cutting: Semi-hardwood
Timing: Summer
Method: 10cm (4in) cuttings in a slightly heated propagator or pot covered in plastic
Notes: Use rooting hormone

NAME: *CAMELLIA*

Type of cutting: a) Semi-hardwood or b) leaf-bud
Timing: Early summer
Method: a) 7–10cm (3–4in) cuttings in peat and sand mix in slightly heated propagator or mist. b) Several leaf-bud cuttings can be taken from a single semi-ripe stem – cut the stem into lengths just above each leaf and trim to leave 2.5cm (1in) below each leaf. Treat as above, ensuring the bud is level with the surface. Do not use rooting hormone powder or liquid on leaf-bud cuttings
Notes: Slow to root without a heated propagator. Do not begin feeding until the cuttings are well rooted

NAME: *CARYOPTERIS*

Type of cutting: Semi-hardwood
Timing: Early summer
Method: 8–10cm (3–4in) cuttings in a cold frame or sun tunnel
Notes: Rooting hormone not required. Cuttings root very easily and quickly, and can usually be potted up in early autumn

LEFT *Cistus* x *danseraui* 'Decumbens'

ABOVE **Many cotoneasters will readily root in a cold frame**

NAME: *CASSINIA*

Type of cutting: Semi-hardwood
Timing: Early to mid-autumn
Method: 8–10cm (3–4in) cuttings in a cold frame or unheated propagator
Notes: Keep protected from cold weather

NAME: *CEANOTHUS* (CALIFORNIAN LILAC)

Type of cutting: a) Softwood or b) semi-hardwood
Timing: a) Spring or b) late summer to early autumn
Method: a) 10cm (4in) soft tip cuttings of deciduous types in a propagator at 18°C (65°F). b) For evergreen types, take10–15cm (4–6in) long semi-ripe cuttings with a heel, and insert them in a slightly heated propagator, or even a pot that is covered with plastic
Notes: Use rooting hormone for softwood but not semi-hardwood cuttings. Evergreen cuttings will defoliate if the air temperature becomes too high, so keep them well shaded

NAME: *CERATOSTIGMA* (HARDY PLUMBAGO)

Type of cutting: Semi-hardwood
Timing: Early summer
Method: 5cm (2in) cuttings in cold frame, propagator or sun tunnel
Notes: Rooting hormone is not necessary. Take the cuttings early, as soon as the wood begins to harden. Rooting is then usually very quick; the cuttings will need potting up in the autumn or they will rapidly become leggy

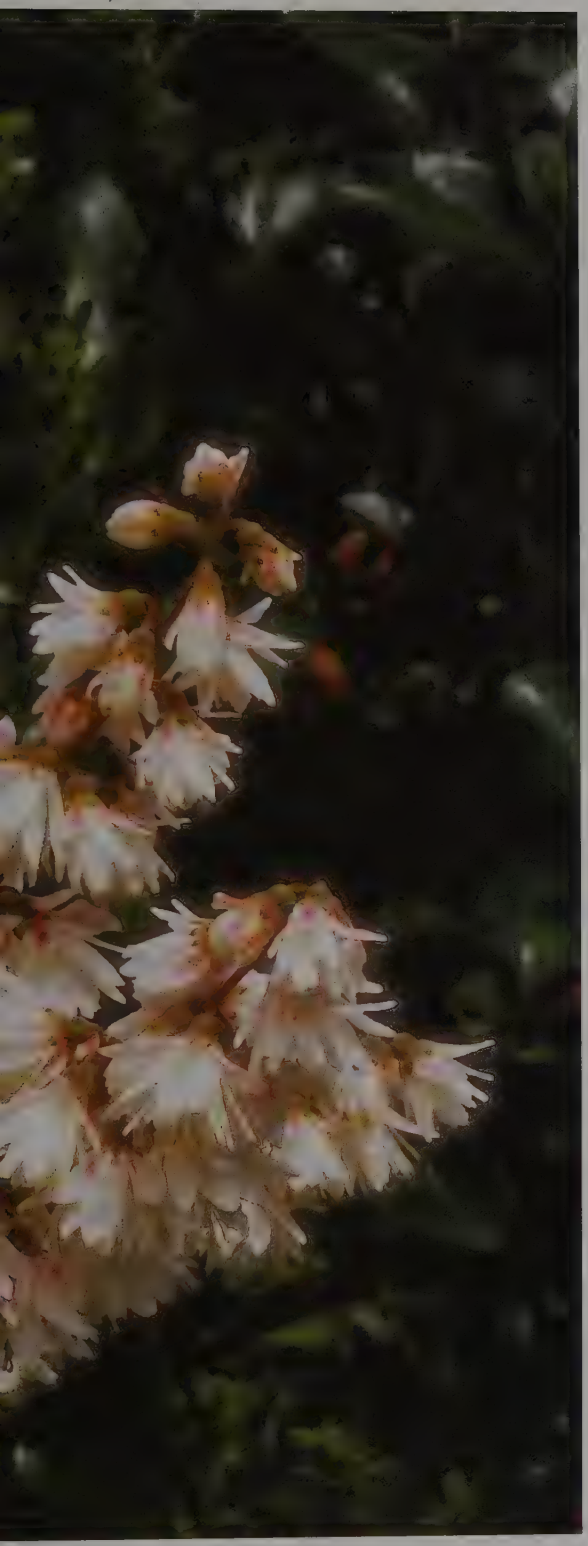
NAME: *CHAENOMELES* (JAPONICA, ORNAMENTAL QUINCE)

Type of cutting: Semi-hardwood
Timing: Early summer
Method: 5–10cm (2–4in) cuttings from newer soft growth in a pot covered with plastic, a cold frame or sun tunnel
Notes: Use rooting hormone. Rooting is usually fairly rapid, but potting up is best left until early spring to allow the root system time to establish

NAME: *CHIMONANTHUS* (WINTER SWEET)

Type of cutting: Semi-hardwood
Timing: Early summer
Method: 5–10cm (2–4in) cuttings, under mist or in a heated propagator
Notes: Use rooting hormone powder or liquid. *Chimonanthus* is a challenge to root, so insert as many cuttings as possible

BELOW ***Daphne odora* 'Aureomarginata'**



NAME: *CHOISYA*

Type of cutting: Semi-hardwood
Timing: Early summer or mid-autumn
Method: Take 10cm (4in) 'firm' cuttings, inserting into pots covered with plastic (summer) or in a cold frame (autumn)
Notes: Use rooting hormone

NAME: *CISTUS* (SUN ROSE)

Type of cutting: a) Softwood or b) semi-hardwood
Timing: a) Late spring or b) late summer to early autumn
Method: a) 5–8cm (2–3in) soft tips in propagator at 18°C (65°F) or b) 8cm (3in) semi-ripe cuttings in well-drained compost in a cold frame or greenhouse
Notes: Use rooting hormone. Protect the cuttings from frost over winter

NAME: *CLERODENDRUM*

Type of cutting: a) Semi-hardwood or b) root
Timing: a) Mid to late summer or b) early to mid-winter
Method: a) Take 8–10cm (3–4in) cuttings, inserting them into propagator at 21°C (70°F). b) Take 8cm (3in) pieces of root and lay them horizontally in sandy compost in trays in the greenhouse. Pot up or plant out when several shoots have emerged
Notes: In spring, the new shoots can sometimes be removed from around the base as Irishman's cuttings

LEFT *Deutzia* x *hybrida* 'Magicien'

ABOVE ***Euonymus alatus* 'Compactus', a dwarf deciduous form**

NAME: *CONVOLVULUS CNEORUM*

Type of cutting: Semi-hardwood
Timing: Early autumn
Method: 8–10cm (3–4in) cuttings in sandy compost in a greenhouse or cold frame
Notes: Rooting hormone is not required. The velvety grey foliage should not be allowed to become too moist, otherwise grey mould (*Botrytis*) may set in

NAME: *COPROSMA*

Type of cutting: Semi-hardwood
Timing: Late summer
Method: 5–8cm (2–3in) cuttings in pot in greenhouse or cold frame
Notes: Protect from frost over winter

NAME: *CORNUS* (DOGWOOD)

Type of cutting: a) Semi-hardwood or b) hardwood
Timing: a) Early summer or b) late autumn to early winter
Method: a) 8–10cm (3–4in) cuttings in a sun tunnel or b) lengths of stem 20cm (8in) long, in a cold frame or the open ground; lift and plant the following autumn
Notes: Rooting hormone is not required. Hardwood cuttings are suitable mainly for *Cornus alba* and *C. stolonifera* and their cultivars

NAME: *COROKIA*

Type of cutting: Semi-hardwood
Timing: Late summer to early autumn
Method: Take 5–10cm (2–4in) long cuttings – they can be taken with a heel – and insert them in a propagator at 18°C (65°F)
Notes: Use rooting hormone

ABOVE *Fuchsia* 'Margaret Brown', a hardy fuchsia

RIGHT *Fuchsia magellanica* var. *gracilis* 'Tricolor'

NAME: *COTINUS* (SMOKE TREE)

Type of cutting: Semi-hardwood
Timing: Summer
Method: 10–15cm (4–6in) cuttings, using stems that have only just begun to firm and are slightly woody at the base, in a propagator at 18–20°C (65–68°F). Pot up when rooted and overwinter in a cold frame
Notes: Use rooting hormone. Cuttings must be taken early to allow them to be potted up and well established before winter

NAME: *COTONEASTER*

Type of cutting: a) Semi-hardwood or b) hardwood
Timing: a) Late summer or b) mid-autumn
Method: a) 8–10cm (3–4in) cuttings – may be taken with heel – in a propagator at 18°C (65°F) or cold frame, or b) 10–15cm (4–6in) cuttings in a cold frame
Notes: Use rooting hormone for both types

NAME: *CYTISUS* (BROOM)

Type of cutting: Semi-hardwood
Timing: Mid to late summer
Method: 8–10cm (3–4in) cuttings in covered propagator or cold frame. Once rooted, pot up and overwinter in greenhouse or cold frame
Notes: Use rooting hormone powder or liquid. Can be a challenge unless the cuttings are taken from shoots that are young and have been growing vigorously

NAME: *DAPHNE*

Type of cutting: a) Softwood or b) semi-hardwood
Timing: a) Early summer or b) mid to late summer
Method: a) 5–10cm (2–4in) cuttings from soft tips in propagator at 18°C (65°F), or b) 5–8cm (2–3in) cuttings, preferably with a heel, in cold frame or unheated covered propagator
Notes: Use rooting hormone. Most species are a challenge, but *Daphne odora* roots easily in a cold frame

NAME: *DEUTZIA*

Type of cutting: a) Softwood, b) semi-hardwood or c) hardwood
Timing: a) Late spring, b) summer or c) late autumn to early winter
Method: a) 8–10cm (3–4in) soft tips in warm propagator, b) 5–10cm (2–4in) cuttings in a propagator, sun tunnel or cold frame, or c) 10–25cm (4–10in) cuttings, with a heel, in a cold frame
Notes: Use rooting hormone

NAME: *ELAEAGNUS*

Type of cutting: Semi-hardwood
Timing: Late summer to early autumn
Method: 15cm (6in) cuttings – can be taken with a heel – in a propagator at 21°C (70°F), or in a cold frame though these will take 4–6 months to root
Notes: Use rooting hormone

NAME: *ESCALLONIA*

Type of cutting: Semi-hardwood
Timing: Mid-summer to mid-autumn
Method: 10–15cm (4–6in) cuttings in a slightly heated propagator or in a cold frame
Notes: Use rooting hormone. Either stem or heel cuttings can be taken. *Escallonia* cuttings root quickly and need to be potted up early to prevent damage to the brittle roots

NAME: *EUONYMUS* – EVERGREEN

Type of cutting: a) Semi-hardwood or b) hardwood
Timing: a) Early to mid-autumn or b) autumn
Method: a) 10cm (4in) cuttings in a cold frame or b) 15–20cm (6–8in) cuttings can be rooted directly where required, removing lower leaves and inserting two-thirds into the ground – useful for areas of ground cover types
Notes: Use rooting hormone. Cuttings root quickly and easily

RIGHT **The decorative winter catkins of *Garrya elliptica***

ABOVE ***Genista hispanica* 'Compacta'**

NAME: *EUONYMUS* – DECIDUOUS

Type of cutting: Semi-hardwood
Timing: Early summer
Method: 10–12cm (4–5in) cuttings in cold frame or sun tunnel
Notes: Use rooting hormone. Leave the cuttings until they begin to shoot in the spring and then lift them carefully to prevent damage to the roots. The cuttings often grow slowly in the first season until well established, and the compost should not be allowed to become too wet

NAME: *EURYOPS*

Type of cutting: Softwood
Timing: Mid-spring to early summer
Method: 5–8cm (2–3in) soft tips in a heated propagator. Pot up when rooted and overwinter in a frost-free greenhouse
Notes: The foliage should not be allowed to become too wet, which would encourage grey mould (*Botrytis*) to set in

NAME: *EXOCHORDA*

Type of cutting: Softwood
Timing: Mid-spring to early summer
Method: 8–10cm (3–4in) cuttings in a propagator at 18–21°C (65–70°F) or mist unit
Notes: Wound cuttings by removing a sliver of stem from the base. Use rooting hormone. Difficult without correct conditions and very slow growing to start with

NAME: *FABIANA*

Type of cutting: a) Softwood or b) semi-hardwood
Timing: a) Early summer or b) late summer
Method: a) Take 3–8cm (1¼–3in) soft tip cuttings in a heated propagator, or b) take 5–8cm (2–3in) cuttings in a covered propagator or greenhouse. Overwinter in a frost-free greenhouse
Notes: Use rooting hormone

ABOVE *Hyssopus officinalis* subsp. *aristatus*

NAME: *FORSYTHIA*

Type of cutting: a) Softwood, b) semi-hardwood or c) hardwood
Timing: a) Spring, b) early to mid-summer or c) mid-autumn to early winter
Method: a) 10cm (4in) soft tips in a heated propagator, b) 10–13cm (4–5in) cuttings in a pot covered with plastic or in the sun tunnel, or c) 20cm (8in) cuttings in a cold frame or the open ground
Notes: Rooting hormone is required only for softwood cuttings. Prune young plants as soon as possible to encourage bushiness

NAME: *FUCHSIA*

Type of cutting: a) Softwood or b) semi-hardwood
Timing: a) Early to mid-spring or b) summer to early autumn
Method: 8–10cm (3–4in) cuttings in a pot covered in plastic or in a propagator at 18°C (65°F) – softwood cuttings will root in 2–3 weeks, semi-hardwood in 4–5 weeks
Notes: Cuttings may be nodal or internodal. Spring cuttings will produce flowering plants by summer, whereas later ones will require overwintering in a heated greenhouse

ABOVE **Lavenders propagated from cuttings are much more uniform than those raised from seed, particularly important if they are to be used for a hedge**

NAME: *GARRYA*

Type of cutting: Semi-hardwood
Timing: Late summer
Method: Take 8–10cm (3–4in) long cuttings, preferably with a heel, in a heated propagator or cold frame
Notes: Insert in individual pots or modules to avoid disturbing the roots when potting up. Timing is important – cuttings inserted after late summer will usually produce very poor results

NAME: *GAULTHERIA*

Type of cutting: Semi-hardwood
Timing: Late summer to early autumn
Method: Take 5–10cm (2–4in) long cuttings in peaty compost in a cold frame or in a pot covered with plastic
Notes: Rooting hormone is not required. Pot up into lime-free compost

NAME: *GENISTA* (BROOM/GORSE)

Type of cutting: a) Softwood or b) semi-hardwood
Timing: a) Early summer or b) early to mid-autumn
Method: a) 5–8cm (2–3in) cuttings from soft new growth in a pot covered with plastic or in the sun tunnel – pot up when rooted and overwinter in a cold frame, or b) 10cm (4in) cuttings – with a heel – in a cold frame
Notes: Rooting hormone is not required

NAME: *GRISELINIA*

Type of cutting: a) Semi-hardwood or b) hardwood
Timing: a) Summer or b) mid to late autumn
Method: a) 10–15cm (4–6in) cuttings in a cold frame or slightly heated propagator, or b) 20–30cm (8–12in) cuttings of fully ripe growth in a cold frame or outside in mild areas
Notes: Rooting hormone is not required

NAME: *HALIMIUM*

Type of cutting: Semi-hardwood
Timing: Mid to late summer
Method: Take 8–10cm (3–4in) long cuttings in a cold frame
Notes: Use rooting hormone

RIGHT ***Leptospermum scoparium* (Nanum Group) 'Kea'**

ABOVE **Privets (*Ligustrum*) are easily rooted using semi-hardwood or hardwood cuttings**

NAME: *HEBE*

Type of cutting: a) Softwood or b) semi-hardwood
Timing: a) Early to mid-spring or b) summer to mid-autumn
Method: a) 3–8cm (1–3in) soft tip cuttings in a heated propagator or b) 5–10cm (2–4in) cuttings in a covered propagator or cold frame – move less hardy types to a frost-free greenhouse for overwintering
Notes: Use rooting hormone for softwood cuttings – it is not necessary for later ones

NAME: *HELIANTHEMUM* (ROCK ROSE)

Type of cutting: Semi-hardwood
Timing: Early summer or autumn
Method: 3–5cm (1¼–2in) cuttings taken from non-flowering tips in an unheated propagator (keep shaded) or a cold frame
Notes: Use rooting hormone. Overwinter autumn cuttings in a greenhouse. Allow the cuttings to establish well before potting up as the root system is prone to detach from the stem if it is not well developed

NAME: *HELICHRYSUM* – SHRUBBY TYPES

Type of cutting: Semi-hardwood
Timing: Summer
Method: 5–8cm (3–4in) cuttings – can be taken with heel – in pots in a greenhouse or cold frame
Notes: Overwinter in a greenhouse. The grey foliage should not be allowed to become too wet or grey mould (*Botrytis*) may set in

NAME: *HIBISCUS*

Type of cutting: a) Softwood or b) semi-hardwood
Timing: a) Late spring or b) summer
Method: a) 8–10cm (3–4in) cuttings from firm shoots that are just slightly woody at the base, in a heated propagator, or b) 15cm (6in) cuttings in sandy compost in a propagator or cold frame – pot up the following spring and grow on for a year
Notes: Rooting hormone is required only for softwood cuttings

BELOW **Mahonias are propagated by means of leaf-bud or mallet cuttings**

NAME: *HOHERIA*

Type of cutting: Semi-hardwood
Timing: Late summer to early autumn
Method: 8–10cm (3–4in) cuttings in propagator or cold frame
Notes: Use rooting hormone. Protect from winter frosts

NAME: *HYDRANGEA*

Type of cutting: a) Softwood or b) semi-hardwood
Timing: a) Early summer or b) mid to late summer
Method: a) Take 8–10cm (3–4in) long cuttings in a heated propagator or mist unit, or b) take 10cm (4in) long cuttings in a propagator or pot covered with plastic
Notes: Cuttings may be nodal or internodal, and rooting hormone is required only for softwood cuttings

NAME: *HYPERICUM*

Type of cutting: Semi-hardwood
Timing: Mid-summer to late autumn
Method: 10cm (4in) cuttings (shorter lengths for shrubby alpine types) in a cold frame
Notes: Use rooting hormone

NAME: *HYSSOPUS*

Type of cutting: a) Softwood or b) semi-hardwood
Timing: a) Late spring or b) late summer
Method: a) 5–8cm (2–3in) cuttings from soft new shoots in a pot covered with plastic or in a propagator, or b) 5–8cm (2–3in) cuttings in a cold greenhouse
Notes: Use rooting hormone

NAME: *INDIGOFERA*

Type of cutting: Semi-hardwood
Timing: Mid-summer
Method: Take 8–10cm (3–4in) long cuttings, inserting them in a pot covered with plastic or in an unheated propagator
Notes: Use rooting hormone powder or liquid. Overwinter young plants in a greenhouse. The young plants are prone to grey mould (*Botrytis*) so do not allow them to become overwet during the winter

NAME: *KALMIA*

Type of cutting: Semi-hardwood
Timing: Late summer to early autumn
Method: 5–8cm (2–3in) cuttings in sand/peat mix in heated propagator
Notes: Use rooting hormone. Rooting is very slow and results can be very variable. Pot up into lime-free compost when rooted

NAME: *KERRIA*

Type of cutting: a) Semi-hardwood or b) hardwood
Timing: a) Early to mid-summer or b) mid to late autumn
Method: a) 5–8cm (2–3in) cuttings in a cold frame or sun tunnel, or b) lengths of stem 20cm (8in) long, in a cold frame or in the open ground, inserting two-thirds of the stem; lift the following autumn
Notes: Roots readily without the use of hormone

LEFT *Myrtus communis* subsp. *tarantina*

ABOVE *Origanum vulgare* 'Aureum Crispum', a golden marjoram

NAME: *KOLKWITZIA*

Type of cutting: Semi-hardwood
Timing: Early summer
Method: 10–15cm (4–6in) cuttings in an unheated propagator, cold frame or sun tunnel
Notes: Use rooting hormone powder or liquid. The cuttings grow rapidly and can usually be potted in early autumn

NAME: *LAVANDULA* (LAVENDER)

Type of cutting: a) Semi-hardwood or b) hardwood
Timing: a) Take cuttings in late summer or b) mid to late autumn
Method: a) 8–10cm (3–4in) cuttings, or preferably with a heel, in a cold frame, b) 10–20cm (4–8in) cuttings with a heel in a cold frame or sheltered spot outside in mild areas
Notes: Some ventilation is required to prevent the foliage becoming too moist and risking infection by grey mould (*Botrytis*)

NAME: *LAVATERA* (SHRUBBY MALLOW)

Type of cutting: a) Softwood or b) semi-hardwood
Timing: a) Spring or b) early autumn
Method: a) 5–8cm (2–3in) soft tips, as growth starts, in a slightly heated propagator, or b) 13–15cm (5–6in) cuttings in a cold frame
Notes: Use rooting hormone for softwood cuttings only. Protect autumn cuttings from frosts

NAME: *LEPTOSPERMUM*

Type of cutting: Semi-hardwood
Timing: Mid-summer
Method: 8cm (3in) cuttings – may be taken with heel – in sand/peat mix in a propagator at 18°C (65°F)
Notes: Use rooting hormone. Rooting is usually quick and cuttings can be potted in the early autumn if well established

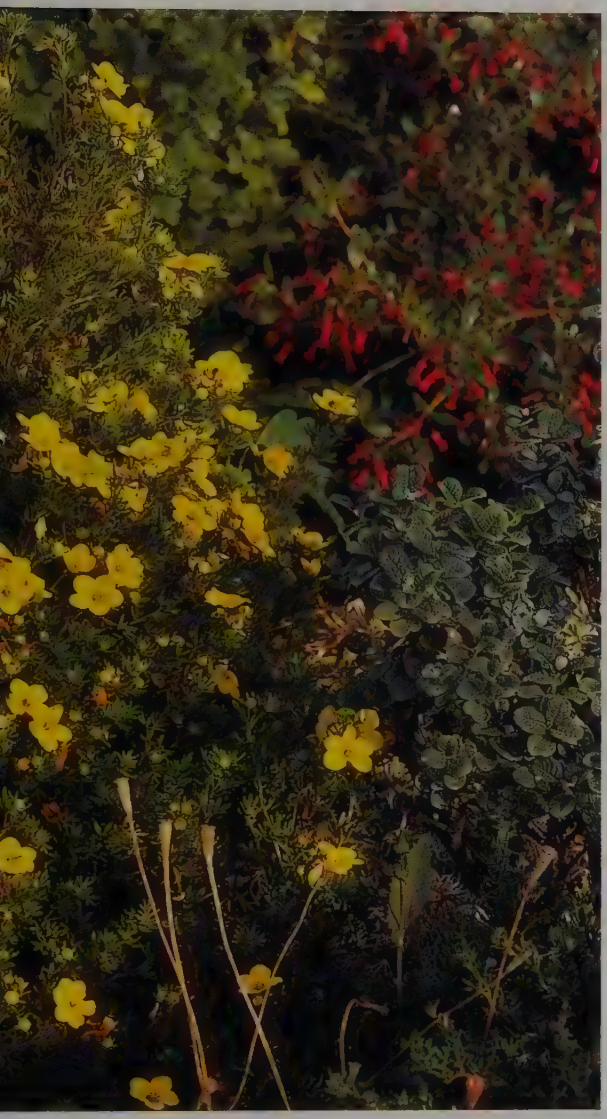
RIGHT *Photinia* x *fraseri* 'Red Robin'

NAME: *LEYCESTERIA*

Type of cutting: a) Semi-hardwood or b) hardwood
Timing: a) Late summer or b) late autumn to early winter
Method: a) 10–15cm (4–6in) cuttings in a cold frame or propagator, or b) hardwood lengths of 15–25cm (6–10in), in a cold frame or sheltered spot outside
Notes: Rooting hormone is not required

NAME: *LIGUSTRUM* (PRIVET)

Type of cutting: a) Semi-hardwood or b) hardwood
Timing: a) Mid to late summer or b) mid-autumn to early winter
Method: a) 10–13cm (4–5in) cuttings in a shaded cold frame, or b) 15–30cm (6–12in) cuttings with tips removed, in a cold frame or by inserting two-thirds into a trench outside
Notes: Rooting hormone is only required for hardwood cuttings



LEFT *Potentilla* 'Sungold'

NAME: *LONICERA* (SHRUBBY HONEYSUCKLE)

Type of cutting: a) Semi-hardwood or b) hardwood
Timing: a) Early to mid-summer or b) mid to late autumn
Method: a) Cuttings 10cm (4in) long, in a cold frame (evergreen or deciduous species), or in a sun tunnel (deciduous species only), or b) 20–25cm (8–10in) cuttings in a cold frame or outside in mild areas
Notes: Rooting hormone is not required.

Both *Lonicera nitida* and *Lonicera pileata* root very freely, but deciduous species are best rooted in summer

NAME: *MAHONIA*

Type of cutting: a) Leaf-bud or b) semi-hardwood
Timing: a) Late summer to mid-autumn or late winter, or b) late summer to early autumn
Method: a) Trim stem into bud cuttings, each piece cut just above a leaf and 2cm (¾in) below; insert into peaty compost in a heated propagator at 15–18°C (60–65°F), b) Mallet cuttings 8–10cm (3–4in) long, comprising current season's side shoots with piece of previous year's wood attached at base. Place in a propagator at 15–18°C (60–65°F)
Notes: Do not use rooting hormone on leaf-bud cuttings

NAME: *MYRTUS* (MYRTLE)

Type of cutting: Semi-hardwood
Timing: Late summer
Method: 10–15cm (4–6in) cuttings in a heated propagator at 18°C (65°F)
Notes: In milder districts, cuttings can be rooted in a cold frame. Rooting can be very slow even with bottom heat

NAME: *NEILLIA*

Type of cutting: Semi-hardwood
Timing: Mid to late summer
Method: 8–10cm (3–4in) cuttings in a propagator at 18°C (65°F)
Notes: Use rooting hormone

ABOVE *Pyracantha* 'Teton'

NAME: *OLEARIA* (DAISY BUSH)

Type of cutting: Semi-hardwood
Timing: Late summer to early autumn
Method: 15cm (6in) cuttings with a heel in sandy compost in a cold frame or slightly heated propagator
Notes: Rooting hormone is not required. It is important to protect cuttings from severe frosts. Rooting can be slow

NAME: *ORIGANUM*

Type of cutting: Semi-hardwood
Timing: Summer
Method: Take 5–8cm (2–3in) long cuttings in a covered propagator
Notes: Great care is required with the hairy-leafed forms – the cuttings must be kept moist but water must be kept off the foliage, so use a small watering can and water only the compost

NAME: *OSMANTHUS*

Type of cutting: Semi-hardwood
Timing: Early to mid-autumn
Method: 15–20cm (6–8in) cuttings of side shoots with a heel in the cold frame
Notes: Use rooting hormone. The best results will be obtained from short stocky shoots

NAME: *PACHYSANDRA*

Type of cutting: Semi-hardwood
Timing: Mid-summer
Method: Take 8–10cm (3–4in) long cuttings in a cold frame
Notes: Shoots can usually be removed as Irishman's cuttings in the spring

NAME: *PARAHEBE*

Type of cutting: Semi-hardwood
Timing: Mid to late summer
Method: 2–4cm (¾–1½in) cuttings in a propagator or cold frame
Notes: Use rooting hormone. The cuttings should be trimmed as soon as they begin to grow to prevent them becoming thin and leggy

NAME: *PERNETTYA*

Type of cutting: Semi-hardwood
Timing: Summer
Method: 8–10cm (3–4in) cuttings in peaty compost in a cold frame
Notes: Rooting hormone is not required. Pot up into lime-free compost when rooted

NAME: *PEROVSKIA* (RUSSIAN SAGE)

Type of cutting: a) Softwood or b) semi-hardwood
Timing: a) Late spring or b) mid to late summer
Method: a) 5–8cm (2–3in) soft tip cuttings in a heated propagator, or b) semi-hardwood cuttings 10cm (4in) long – may be taken with a heel – in a pot covered in plastic or an unheated propagator
Notes: Use rooting hormone

NAME: *PHILADELPHUS* (MOCK ORANGE)

Type of cutting: a) Softwood, b) semi-hardwood or c) hardwood
Timing: a) Late spring, b) summer or c) late autumn to early winter
Method: a) Soft tip cuttings 8–10cm (3–4in) long, inserted in a propagator at 18°C (65°F), b) semi-hardwood cuttings 10cm (4in) long, inserted in a cold frame, unheated propagator or sun tunnel, or c) hardwood cuttings 20–30cm (8–12in) long, with a heel, in a cold frame or the open ground
Notes: Use rooting hormone. Leave summer cuttings *in situ* until they show signs of growth in the early spring

ABOVE *Rosmarinus officinalis*

NAME: *PHOTINIA*

Type of cutting: Semi-hardwood
Timing: Mid to late summer
Method: Take 10–15cm (4–6in) long cuttings in a pot covered with plastic, a covered propagator or a cold frame
Notes: Use rooting hormone. Can be a challenge to root, and bottom heat of 18°C (65°F) is often beneficial. Pot up once rooted and overwinter in a cold frame

NAME: *PHYGELIUS*

Type of cutting: Softwood or semi-hardwood
Timing: Summer
Method: 5–8cm (2–3in) soft tip or semi-ripe cuttings in a propagator or cold frame
Notes: Use rooting hormone. Cuttings root readily at most times of the year

NAME: *PHYSOCARPUS*

Type of cutting: a) Semi-hardwood or b) hardwood
Timing: a) Early to mid-summer or b) late autumn to early winter
Method: a) 10–15cm (4–6in) cuttings in a sun tunnel or cold frame, or b) 15cm (6in) lengths in a cold frame
Notes: Roots freely without rooting hormone

NAME: *PIERIS*

Type of cutting: Semi-hardwood
Timing: Mid-summer to early autumn
Method: Take 3–5cm (1¼–2in) long cuttings from side shoots, in peaty compost in a propagator at 21°C (70°F) or in sand/peat mix in a cold frame
Notes: Use rooting hormone. Protect the cuttings from spring frosts

NAME: *PITTOSPORUM*

Type of cutting: Semi-hardwood
Timing: Mid-summer to mid-autumn
Method: 8–10cm (3–4in) cuttings, with a heel, in a propagator at 18°C (65°F) or in a cold frame covered with plastic. Wound the cutting by taking a sliver of wood from the base
Notes: Use rooting hormone, and pot the cuttings up as soon as they have rooted to minimize root damage

NAME: *POTENTILLA*

Type of cutting: a) Softwood or b) semi-hardwood
Timing: a) Early summer or b) early to mid-autumn
Method: a) 10cm (4in) cuttings from new shoots in a covered propagator or sun tunnel, or b) 8–15cm (3–6in) cuttings in a cold frame
Notes: Use rooting hormone. Remove any flower buds from shoots used as cuttings

NAME: *PROSTANTHERA* (MINT BUSH)

Type of cutting: Semi-hardwood
Timing: Late summer
Method: Take 3–5cm (1¼–2in) long cuttings, using a good draining compost; insert in a covered propagator
Notes: Use rooting hormone liquid or powder. The cuttings are prone to leaf drop if the compost becomes too dry

NAME: *PYRACANTHA* (FIRETHORN)

Type of cutting: Semi-hardwood
Timing: Late summer to early autumn
Method: 10–15cm (4–6in) cuttings in a cold frame or slightly heated propagator
Notes: Remove spines as well as leaves from lower part of cutting, and use rooting hormone

NAME: *RHAMNUS* (BUCKTHORN)

Type of cutting: Semi-hardwood
Timing: Mid to late summer
Method: 10–15cm (4–6in) cuttings either in a pot or a cold frame covered with plastic
Notes: Use rooting hormone. Not easy to root, variegated forms being especially difficult

NAME: *RHODODENDRON*

Type of cutting: Semi-hardwood
Timing: Summer
Method: Take 10–13cm (4–5in) long cuttings, using a peat/sand mix, and insert in a pot covered with plastic, a propagator at 16–18°C (55–65°F) or a mist unit. The length of time taken to root varies considerably with both the species and the conditions
Notes: Use rooting hormone. Remove the growing tip and cut large leaves in half. Small-leafed types are easier to root

NAME: *RIBES* (FLOWERING CURRANT)

Type of cutting: a) Softwood or b) hardwood
Timing: a) Early summer or b) mid-autumn
Method: a) 6–10cm (3–4in) cuttings from new shoots in a heated propagator, or b) 20–30cm (8–12in) lengths of stem, inserting two-thirds into the open ground – can be rooted in final position or lifted and transplanted the following spring or autumn
Notes: Use rooting hormone

BELOW *Salvia blepharophylla*

ABOVE ***Salvia officinalis* 'Icterina'**

NAME: *ROSA* (ROSE)

Type of cutting: a) Semi-hardwood or b) hardwood
Timing: a) Late summer (after flowering) or b) early to mid-autumn
Method: a) 15–25cm (6–10in) cuttings of the current year's growth in a propagator, or bury in a shady spot outside and lift when new growth emerges. For miniatures, place short cuttings in a propagator or cold frame, b) 23–30cm (9–12in) cuttings outside, inserting the lower two-thirds into the ground
Notes: Use rooting hormone. Suitable for species roses and their cultivars, ramblers, climbers and miniature roses.

NAME: *ROSMARINUS* (ROSEMARY)

Type of cutting: Semi-hardwood
Timing: Late summer to mid-autumn
Method: 13cm (5in) cuttings with a heel in a cold frame
Notes: Rooting hormone is not required

NAME: *RUBUS* (ORNAMENTAL BRAMBLE)

Type of cutting: a) Hardwood or b) root (*Rubus cockburnianus*)
Timing: a) Autumn to early winter, or b) early to mid-winter
Method: a) Take 20–25cm (8–10in) lengths, inserting either in a cold frame or outside, or b) pot up individual sections of root and overwinter in a greenhouse
Notes: Rooted pieces can often be removed from around the base of the plant and treated as Irishman's cuttings

NAME: *RUTA* (RUE)

Type of cutting: Semi-hardwood
Timing: Mid-summer
Method: 5–8cm (2–3in) cuttings just beginning to firm up at the base. Insert in a pot covered with plastic or an unheated propagator
Notes: Rooting hormone not required. Wear gloves as the sap can cause allergic reactions

ABOVE *Santolina rosmarinifolia*

NAME: *SALVIA* (SAGE)

Type of cutting: Semi-hardwood
Timing: Late spring to early autumn
Method: 10cm (4in) cuttings in well-drained compost in a pot in a cold frame – overwinter in the cold frame
Notes: It is advisable to take some cuttings each year in case of winter losses. Grey-leaved forms need care to prevent the foliage becoming too wet

NAME: *SAMBUCUS* (ELDER)

Type of cutting: Hardwood
Timing: Mid to late winter
Method: Take 20–30cm (8–12in) long cuttings with a heel (stems are pithy), inserting them either in a cold frame or outside
Notes: Rooting hormone is not required

NAME: *SANTOLINA* (COTTON LAVENDER)

Type of cutting: a) Semi-hardwood or b) hardwood
Timing: a) Early to mid-autumn or b) late autumn to early winter
Method: a) 8cm (3in) cuttings in a cold frame, b) 8–13cm (3–5in) cuttings in a cold frame or sheltered spot outside
Notes: Use rooting hormone

NAME: *SARCOCOCCA* (CHRISTMAS BOX)

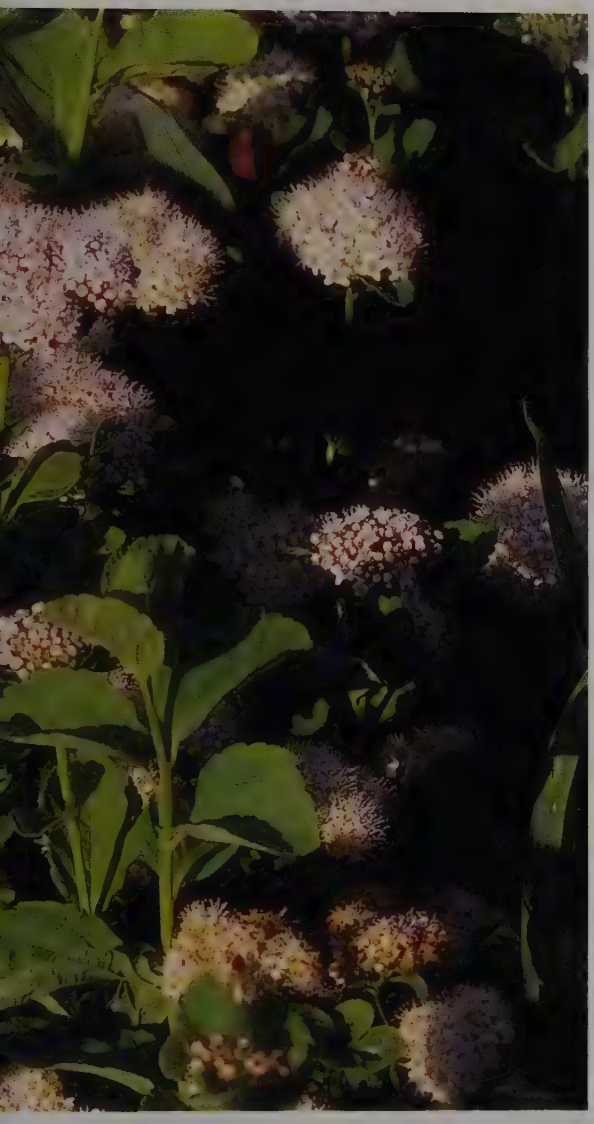
Type of cutting: Semi-hardwood
Timing: Early autumn
Method: Take 8–10cm (3–4in) long cuttings in a cold frame
Notes: Use rooting hormone. Cuttings need to be grown on in pots for one or two years until they become well established

NAME: *SENECIO* – SHRUBBY TYPES

Type of cutting: a) Semi-hardwood or b) hardwood
Timing: a) Late summer or b) mid-autumn
Method: In both cases, 10–15cm (4–6in) cuttings in sandy compost in a cold frame
Notes: Use rooting hormone

NAME: *SKIMMIA*

Type of cutting: a) Semi-hardwood or b) hardwood
Timing: a) Early summer or b) autumn
Method: a) 5–8cm (2–3in) cuttings from shoot tips in peaty compost, in a pot covered with plastic or in a cold frame, or b) hardwood cuttings 15cm (6in) long, using side shoots with a heel, in a cold frame
Notes: Use rooting hormone. Pot rooted cuttings into lime-free compost



LEFT *Spiraea betulifolia* var. *aemiliana*

NAME: *SPIRAEA*

Type of cutting: a) Softwood, b) semi-hardwood or c) hardwood
Timing: a) Mid-spring, b) early summer or c) late autumn to early winter
Method: a) 5–8cm (2–3in) cuttings in a propagator, b) 5–8cm (2–3in) cuttings in a sun tunnel or cold frame, or c) 15–20cm (6–8in) cuttings in a cold frame or outside
Notes: Rooting hormone is not required. Softwood cuttings root easily

NAME: *STEPHANANDRA*

Type of cutting: a) Semi-hardwood or b) hardwood
Timing: a) Mid-summer or b) late autumn
Method: a) 8–15cm (3–6in) cuttings in a cold frame, or b) 15–20cm (6–8in) cuttings in a cold frame or sheltered spot outside
Notes: Use rooting hormone

NAME: *SYMPHORICARPOS*

Type of cutting: Hardwood
Timing: Mid-autumn to early winter
Method: 15–20cm (6–8in) cuttings with lower two-thirds inserted, in a cold frame or outside
Notes: Rooting hormone is not required. Transplant the following autumn

NAME: *SYRINGA* (LILAC)

Type of cutting: Semi-hardwood
Timing: Early summer
Method: 5–10cm (2–4in) cuttings in a well-sealed cold frame or sun tunnel
Notes: Use rooting hormone. Results can be very variable, as the cuttings are prone to disease infection

NAME: *TAMARIX* (TAMARISK)

Type of cutting: Hardwood
Timing: Late autumn to early winter
Method: 15cm (6in) cuttings in a pot in a cold frame, or 20–25cm (8–10in) cuttings in the open ground
Notes: Rooting hormone is not required

NAME: *TEUCRIUM*

Type of cutting: a) Softwood or b) semi-hardwood
Timing: a) During late spring or b) summer to early autumn
Method: a) 3–5cm (1–2in) soft tips in a slightly heated propagator, or b) 3–5cm (1–2in) cuttings from stem tips in a cold frame
Notes: Patience is required. Some species and varieties can take several months to root. Take care when potting up as the root system is easily detached from the stem

NAME: *THYMUS* (THYME)

Type of cutting: a) Softwood or b) semi-hardwood
Timing: a) Late spring or b) summer
Method: a) Take 3cm (1in) long cuttings in a slightly heated propagator, or b) take semi-hardwood cuttings 3cm (1in) long, in pots in a cold frame
Notes: Roots freely, as long as young, vigorous shoots are used

NAME: *ULEX* (GORSE)

Type of cutting: Semi-hardwood
Timing: Late summer to early autumn
Method: 10–15cm (4–6in) cuttings (or shorter for dwarf forms) in peaty compost in a cold frame or unheated propagator
Notes: Use rooting hormone. Good results can usually be obtained without removing the spines from the stem

NAME: *VACCINIUM*

Type of cutting: Semi-hardwood
Timing: Late summer
Method: 10cm (4in) cuttings in peaty compost in a cold frame or propagator
Notes: It is important to pot the cuttings up into lime-free compost once they are rooted

NAME: *VIBURNUM* – EVERGREEN

Type of cutting: Semi-hardwood
Timing: Mid-summer to early autumn
Method: Take 13–15cm (5–6in) long cuttings in cold frame
Notes: Remove any flower buds from shoots, and use rooting hormone

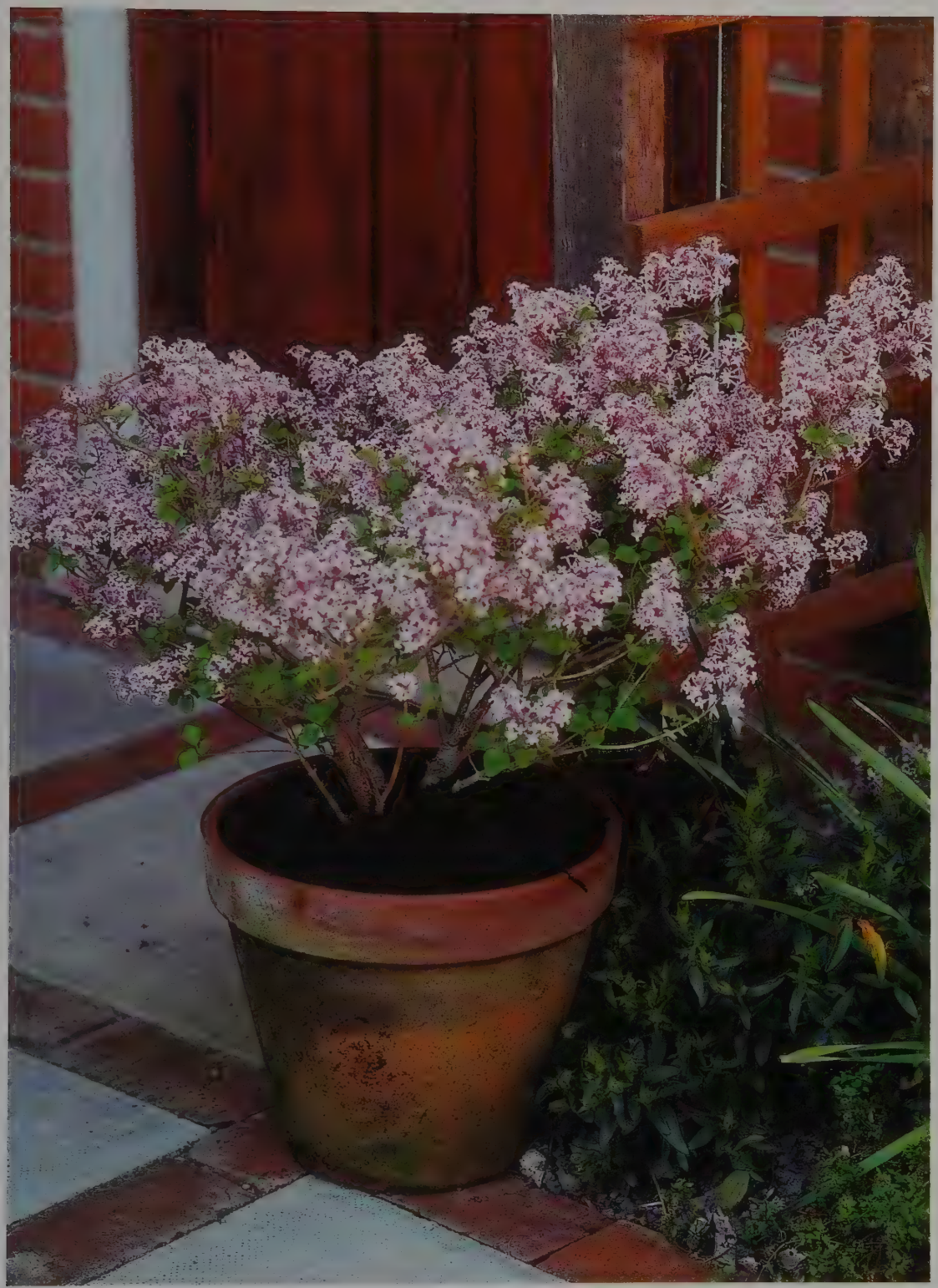
NAME: *VIBURNUM* – DECIDUOUS

Type of cutting: a) Softwood, b) semi-hardwood or c) hardwood
Timing: a) Late spring, b) summer or c) late autumn to early winter
Method: a) Take 8–10cm (3–4in) soft tips of new growth in a heated propagator, b) 8–15cm (3–6in) long cuttings in a cold frame, sun tunnel or slightly heated propagator, or c) hardwood cuttings in 13–15cm (5–6in) lengths, in a cold frame
Notes: Use rooting hormone

NAME: *WEIGELA*

Type of cutting: a) Semi-hardwood or b) hardwood
Timing: a) Mid to late summer or b) late autumn to early winter
Method: a) Take 10–13cm (4–5in) long cuttings just beginning to ripen at the base in a cold frame, sun tunnel or propagator, or b) 23–25cm (9–10in) cuttings, wounding the base by removing a sliver of wood, in a cold frame or outside
Notes: Use rooting hormone

RIGHT *Syringa meyeri* var. *spontanea* 'Palibin'



CHAPTER 8

Other plants from cuttings

CLIMBERS

Climbing plants are generally propagated from softwood cuttings (young, green stems at or near the tip) or semi-hardwood cuttings (from stems that are just ripening), and these methods are advisable for many species and all named cultivars. Cut stems just below a node – except for *Clematis*, which roots better from internodal cuttings, as described below. Some climbers can be propagated by taking hardwood cuttings in autumn or winter, from shoots that have become woody after a season's growth.

Softwood cuttings take one to two months to root, and should be kept in a propagator or a pot covered with a plastic bag. Semi-hardwood cuttings will take two to three months in a propagator, cold frame or sun tunnel, while hardwood cuttings may take a long time to root, sometimes several months, either in a cold frame or inserted in the ground outside.

NAME: *CLEMATIS*

Type of cutting: Semi-hardwood
Timing: Summer
Method: Take internodal cuttings by cutting the stem just above a node and leaving 2.5–5cm (1–2in) below the node. One leaf may be removed from the cutting, taking care not to damage the leaf bud. Place in a closed heated propagator at 18–21°C (65–70°F)
Notes: Use young, thin stems. Rooting hormone is beneficial. Many of the large-flowered hybrids do not root readily from cuttings taken from mother plants growing outside. Using material from young plants growing under cover is usually more successful

NAME: *HEDERA* (IVY)

Type of cutting: a) Softwood, b) semi-hardwood or c) hardwood
Timing: a) Spring, b) early to mid-summer or c) autumn
Method: a) 3–5cm (1–2in) tips or b) 5–10cm (2–4in) semi-hardwood cuttings, both with a heated propagator or a pot covered in a plastic bag. c) Insert ripe sections of stem 10–13cm (4–5in) long in the cold frame
Notes: A single leaf with a 3cm (1in) piece of stem can also be used; treat this as for semi-hardwood cuttings. Very hard woody pieces are not easy to root

ABOVE *Clematis montana* var. *rubens* 'Pink Perfection', a vigorous climber

NAME: *JASMINUM* (JASMINE)

Type of cutting: a) Semi-hardwood or b) hardwood
Timing: a) Early to mid-summer or b) mid to late autumn
Method: a) 8–10cm (3–4in) cuttings from side shoots – may be taken with a heel – in cold frame or sun tunnel, or b) place 15–20cm (6–8in) sections of one-year-old wood in a cold frame or the open ground
Notes: Rooting hormone is not necessary. This method is for hardy jasmines only

NAME: *LONICERA* (CLIMBING HONEYSUCKLE)

Type of cutting: a) Semi-hardwood or b) hardwood
Timing: a) Early to mid-summer or b) mid to late autumn
Method: a) 8–15cm (3–6in) semi-ripe cuttings in propagator at 16–18°C (60–65°F), or b) hardwood cuttings in lengths of 13–15cm (5–6in), in a cold frame
Notes: Semi-hardwood cuttings may be taken with a heel of old wood at the base, trimming it and dipping in rooting hormone powder or liquid before inserting

NAME: *MUEHLENBECKIA*

Type of cutting: Semi-hardwood
Timing: Mid-summer to late autumn
Method: Take 5–10cm (2–4in) long cuttings, inserting them in a cold frame
Notes: Pinch out the shoot tips as they develop. Pot the cuttings up promptly, otherwise they will become tangled and difficult to separate

NAME: *PARTHENOCISSUS*

Type of cutting: a) Softwood or b) hardwood
Timing: a) Summer or b) late winter
Method: a) 5–10cm (2–4in) soft tips or stems with two or more buds, in a propagator at 18°C (65°F), or b) hardwood cuttings 3–4cm (1–1½in) long with a single bud, inserted into a propagator at 15–18°C (60–65°F)
Notes: Use rooting hormone on all cuttings. Pot hardwood cuttings up as soon as rooted

NAME: *PASSIFLORA* (PASSION FLOWER)

Type of cutting: Semi-hardwood
Timing: Mid-summer
Method: 10–15cm (4–6in) cuttings from semi-ripe stems in pots in the greenhouse
Notes: Rooting hormone is not necessary. Pot up when rooted and overwinter in the greenhouse or cold frame

NAME: *SCHIZOPHRAGMA*

Type of cutting: Semi-hardwood
Timing: Late summer
Method: 8–10cm (3–4in) cuttings, dipped in rooting hormone, in a pot in a heated propagator at 21°C (70°F)
Notes: Pot up once rooted and overwinter in the greenhouse

NAME: *SOLANUM*

Type of cutting: a) Softwood or b) semi-hardwood
Timing: a) Spring or b) early to mid-summer
Method: a) 8–10cm (3–4in) cuttings from soft tips, inserted in a propagator, or b) semi-hardwood shoots 10cm (4in) long in cold frame or propagator
Notes: Use rooting hormone for all cuttings

LEFT *Clematis* 'The Vagabond', a low-growing clematis suitable for pots

ABOVE **Ivies are readily propagated from various types of stem cutting**

NAME: *VITIS* (VINE)

Type of cutting: Hardwood
Timing: Early winter
Method: Cut 20–25cm (8–10in) lengths from one-year-old shoots, making sure each has at least three buds. Remove any tendrils, and wound the base of each cutting by removing a sliver of bark. Line the cuttings out in a trench in the garden, placing them 15cm (6in) apart, or put them directly into a compost-filled cold frame. Shorter cuttings may be rooted around the edge of a pot, inserting them up to two-thirds their length, so only the top buds are above the surface; keep these in a cold frame
Notes: Use healthy stems, avoiding both very hard overripe wood and soft shoots. 'Vine eye' cuttings are a particular type of short cutting, with only a single bud, or one pair of buds at the top

NAME: *WISTERIA*

Type of cutting: Softwood
Timing: Early summer
Method: 8–10cm (3–4in) cuttings from side shoots in heated propagator at 18°C (65°F)
Notes: Pot up once rooted and overwinter in the greenhouse

TREES

Many deciduous trees can be propagated by means of hardwood cuttings, taken when they are dormant; and inserted outside in the ground or in a cold frame. For a small quantity of cuttings, pots may be used, kept in the cold frame.

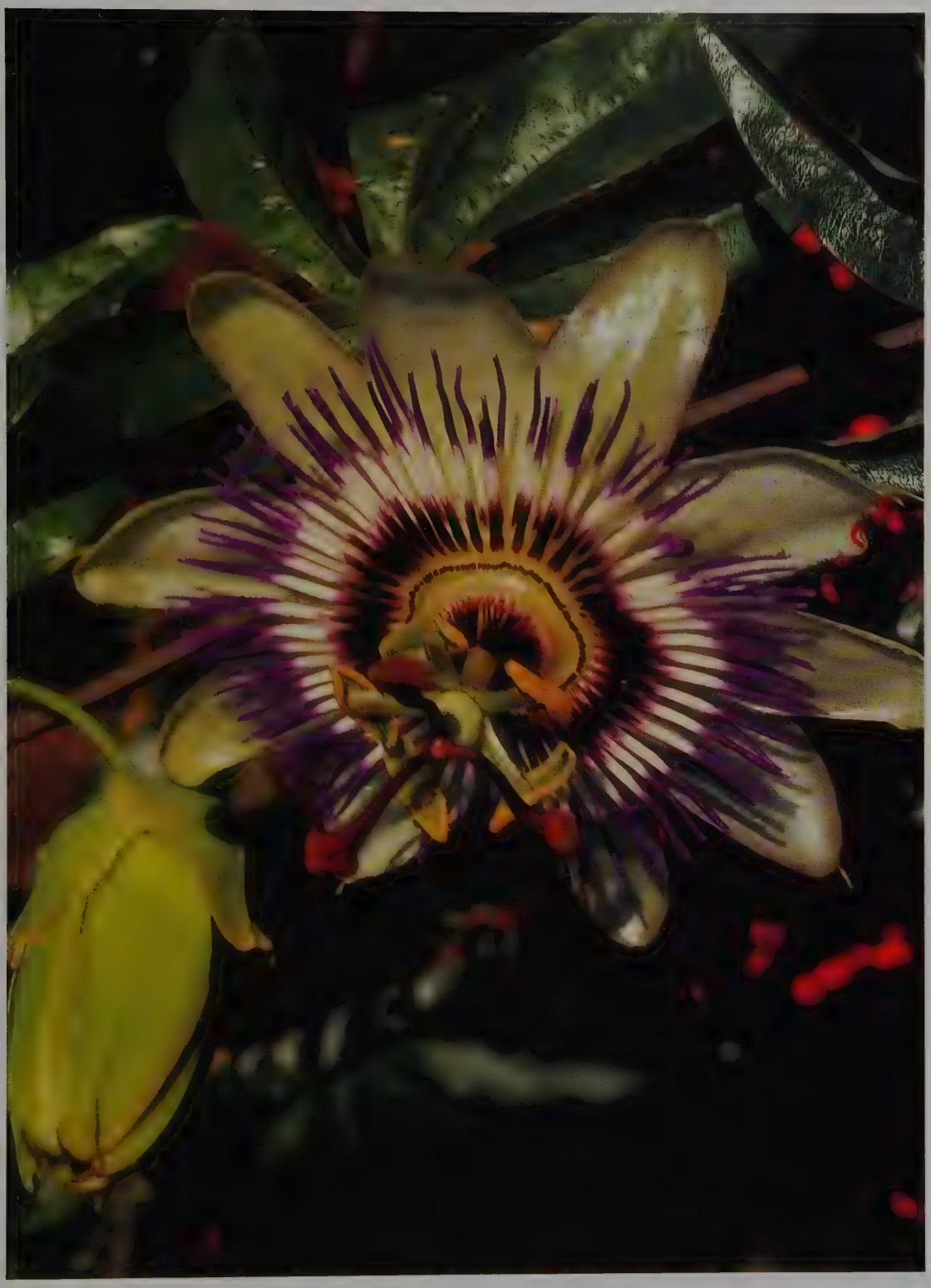
Semi-hardwood cuttings of evergreen trees can be rooted in a cold frame or heated propagator.

Some trees will root readily from softwood cuttings, using the new growing tips of shoots in spring, but as these wilt readily they need the closed humid conditions of a heated propagator.

NAME: *AMELANCHIER* (SNOWY MESPILUS)

Type of cutting: Semi-hardwood
Timing: Early summer
Method: 10–15cm (4–6in) cuttings inserted in a sun tunnel
Notes: Use rooting hormone

RIGHT **Propagate passion flowers by semi-hardwood cuttings**



ABOVE **Holly cuttings can be rooted in a cold frame, though they are subsequently slow to grow on**

NAME: *BETULA* (BIRCH)

Type of cutting: a) Softwood or b) semi-hardwood
Timing: a) Spring or b) early summer
Method: a) 12–15cm (5–6in) cuttings of the current season's growth under mist. Wound the base of each cutting and dip in rooting hormone. Overwinter in pot or tray without potting up, then pot up in early spring as growth begins. b) 8–12cm (3–4in) semi-hardwood cuttings will root readily in a sun tunnel in early summer
Notes: Rooted birch cuttings do not grow much until the following season, so leave potting up until then, as suggested above

NAME: *ILEX* (HOLLY)

Type of cutting: Semi-hardwood
Timing: Mid to late summer
Method: 10cm (4in) cuttings in peaty compost in cold frame. Wound the base of each cutting by removing a shallow sliver of wood. Use rooting hormone
Notes: Pot up the following spring. Hollies grow slowly, so may need to be kept in pots for some time before being ready to plant out

NAME: *LABURNUM*

Type of cutting: Hardwood
Timing: Mid-autumn to winter
Method: 15–20cm (6–8in) cuttings in the ground outside or in a cold frame
Notes: Check outdoor cuttings after a frost and firm the ground if they have been 'lifted'. Leave in place until the following autumn

ABOVE *Populus alba*, the white poplar, can be propagated by means of hardwood cuttings like these

NAME: *POPULUS* (POPLAR)

Type of cutting: Hardwood
Timing: Mid-autumn to early spring
Method: 15–20cm (6–8in) cuttings of the current season's growth in pots in cold frame, or longer lengths in the ground outside
Notes: Easy to root

NAME: *PRUNUS*

Type of cutting: a) Softwood or b) semi-hardwood.
Timing: a) Mid to late spring or b) mid to late summer
Method: a) 10–12cm (4–5in) cuttings in propagator at 18°C (65°F), or b) 12–15cm (5–6in) cuttings in cold frame or sun tunnel
Notes: Let the plants become well established before potting on, as very young roots are easily damaged if they are disturbed too early

NAME: *SALIX* (WILLOW)

Type of cutting: Hardwood
Timing: Late autumn to early spring
Method: 30cm (12in) cuttings or longer – even up to 3m (10ft) – in the ground outside. For dwarf willows, use 5–10cm (2–4in) cuttings and root in a pot in the cold frame
Notes: Willows root readily. Living willow structures can quickly be established by inserting 1.5–2m (4–6ft) lengths straight into the soil in their growing positions

BELOW *Prunus incisa* 'Kojo-no-mai'

NAME: *ULMUS* (ELM)

Type of cutting: a) Softwood or b) semi-hardwood
Timing: a) Early summer or b) late summer
Method: a) 5–8cm (2–3in) cuttings from soft tips in a mist unit at 18°C (65°F), or b) take semi-hardwood cuttings 10–20cm (4–8in) long, and insert them in a sun tunnel
Notes: Cuttings in a sun tunnel should be left over winter before potting up. Protect the new buds against early spring frosts

CONIFERS

Many conifers are readily propagated from semi-hardwood cuttings taken in summer or autumn. The stems will have ripened and become firm, and it is beneficial to remove a thin sliver of wood from the base of each cutting before dipping it in rooting hormone. Cuttings kept in a propagator are likely to root by spring, whereas those in a cold frame are left until the autumn or even the following spring. Cuttings taken from young, vigorous plants root more readily, and the forms that retain their juvenile foliage are particularly easy to root.

ABOVE **Junipers, such as *Juniperus squamata* 'Blue Carpet', can be rooted from semi-hardwood cuttings**

NAME: *CHAMAECYPARIS* (FALSE CYPRESS)

Type of cutting: Semi-hardwood
Timing: Mid to late autumn
Method: 10–15cm (4–6in) cuttings from side or leader shoots (smaller cuttings can be made for dwarf conifers). Remove all foliage from the lower part of the stem and make a shallow wound at the base of the cutting. Insert in a pot in heated propagator or in cold frame
Notes: Use rooting hormone

LEFT **Cuttings of *Ulmus* x *hollandica* 'Jacqueline Hillier' are best rooted under mist or in a sun tunnel**

NAME: *JUNIPERUS* (JUNIPER)

Type of cutting: Semi-hardwood
Timing: Early autumn to mid-winter
Method: Take 5–8cm (2–3in) long cuttings from side or leader shoots, wounding at the base. Insert in a pot, and place this in a propagator or cold frame
Notes: Use rooting hormone

NAME: *THUJA* (ARBOR-VITAE)

Type of cutting: Semi-hardwood
Timing: Early to mid-autumn
Method: 8–15cm (3–6in) cuttings in cold frame. Use the shorter lengths for dwarf varieties. Pot up in late spring
Notes: Use rooting hormone. They root fairly readily from cuttings

ABOVE **Heathers need a shady, closed cold frame to root successfully**

HEATHERS

Cuttings of heathers are usually taken in mid to late summer, using semi-hardwood shoots of the current season's growth. Take short cuttings and do not remove the lower leaves, otherwise you will damage the stems. Insert the cuttings to about half their depth in peat or a peat and sand mix, either in pots in the cold frame, or directly into the cold frame. Keep closed and shaded.

Hardwood cuttings can also be used for some, taking the tips of the shoots in autumn, and giving them the same treatment as above.

NAME: *CALLUNA* (LING HEATHER)

Type of cutting: Semi-hardwood
Timing: Late summer to early autumn
Method: 3cm (1in) cuttings in closed cold frame or with slight heat in propagator
Notes: Rooting hormone is beneficial

NAME: *DABOECIA*

Type of cutting: a) Semi-hardwood or b) hardwood
Timing: a) Mid to late summer or b) mid-autumn
Method: a) cuttings 3cm (1in) long, taken from side shoots, or b) 2–4cm (¾–1½in) long shoot tips, in closed cold frame
Notes: Use rooting hormone

NAME: *ERICA* (HEATHER)

Type of cutting: a) Semi-hardwood or b) hardwood
Timing: a) Mid-summer to early autumn or b) mid-autumn
Method: a) 2–3cm (¾–1in) long cuttings in a shaded cold frame or heated propagator, or b) 2–4cm (¾–1½in) shoot tips in closed cold frame
Notes: Rooting hormone is beneficial

ABOVE **Take tip cuttings of *Ficus benjamina* (weeping fig) and its variegated form**

FRUIT BUSHES

Hardwood cuttings of fruit bushes are best taken in autumn, immediately after the leaves have fallen, and inserted outside while the soil is still warm. Although cuttings can be taken during winter, they tend to remain dormant, and may form shoots in spring first, making rooting more difficult, if not impossible. Use cuttings only from healthy plants that crop well and regularly.

If your soil is very heavy, cuttings may be rooted in deep trays or pots of sandy compost, keeping them moist and shaded. Plant out after one or two years.

NAME: BLACKCURRANT (*RIBES NIGRUM*)

Type of cutting: Hardwood
Timing: Autumn
Method: 20–30cm (8–12in) cuttings from one-year-old stems, removing the tips. Line out in a sand-lined trench outside, inserting so that only one or two buds remain above soil level. Place cuttings 15cm (6in) apart. The following autumn, lift the rooted cuttings and replant them 30cm (12in) apart. Grow on for one year then plant out in final positions
Notes: Rooting hormone is not required. Leave all the buds on the cuttings to encourage suckering or basal shoots

NAME: BLUEBERRY (*VACCINIUM CORYMBOSUM*)

Type of cutting: Softwood
Timing: Mid-summer
Method: 10–15cm (4–6in) cuttings from soft young shoots, removing the lower leaves. Place in a peat and sand mix (needs acidic compost), with the lowest leaves just above the surface. Keep in heated propagator at 20°C (68°F) until rooted. Then pot up into lime-free compost
Notes: Quite difficult to root successfully

LEFT **Geraniums (pelargoniums) are popular plants for taking cuttings from**

NAME: GOOSEBERRY (*RIBES UVA-CRISPA*)

Type of cutting: Hardwood
Timing: Early to mid-autumn
Method: 25–30cm (10–12in) long cuttings taken from straight pieces of pencil-thick one-year-old shoots. Place 15cm (6in) apart in a sand-lined trench, inserting to half their length. For a bush on a stem (or leg) lift the following autumn and remove the lower buds, then plant the young bush. This prevents suckering, but may make rooting more successful
Notes: Use rooting hormone. Can be difficult to root – leave all the buds on until rooted as outlined above

NAME: REDCURRANT (*RIBES SATIVUM*)

Type of cutting: Hardwood
Timing: Mid to late autumn
Method: 30cm (12in) cuttings from one-year-old stems, removing the tips. Line the cuttings out, 20cm (8in) apart, in a sand-lined trench outside, with four buds above soil level. Remove all buds below soil level for a bush on a short stem (or leg), but leave them for a suckering bush. Transplant to final position once rooted
Notes: Use rooting hormone. Treat whitecurrants in the same way

HOUSEPLANTS

Plants that are grown indoors can often easily be increased or renewed by cuttings. These usually require warmth and humidity, provided either by covering the pot of cuttings with a plastic bag and keeping in a warm spot indoors, or by placing in a heated propagator.

Many houseplants have soft stems that can be used as softwood cuttings, utilizing either the tips or sections of stem with a few leaves. Some plants, such as the weeping fig (*Ficus benjamina*), have stems that are more woody, so are treated as semi-hardwood cuttings. Other

ABOVE **Take care that cuttings of *Kalanchoe* don't get too wet**

indoor plants are increased by means of leaf cuttings, using whole, new but fully opened leaves with a section of leaf stalk from which the plantlet emerges. Some leaves can be cut into strips, with two or more plantlets growing from each strip. Then, of course, some plants have variations of these methods, as outlined where relevant in the following plant section.

NAME: *BEGONIA*

Type of cutting: Leaf cutting (whole leaf with stalk, or slashed leaf for *Begonia rex*)
Timing: Spring to summer
Method: Insert a 3–5cm (1–2in) stalk of a newly but fully opened leaf in compost in a pot, and cover with a polythene bag, or put in propagator at 21°C (70°F). For *Begonia rex*, place a whole leaf upside down on a hard surface and slit through each main vein, then place the leaf right side up on the compost surface. It is a good idea to use small stones or wire pins to hold it in place
Notes: Plantlets are formed either from the cut leaf stalk, or in places where the leaf veins have been cut

NAME: *FICUS* (FIG)

Type of cutting: Softwood, semi-hardwood or leaf-bud cuttings
Timing: Spring to summer
Method: For weeping figs (*Ficus benjamina*) and creeping figs (*F. pumila*), take shoot tip cuttings 8–15cm (3–6in) long, inserting them in a pot, and then placing them in a propagator

RIGHT ***Ruellia*** **is a flowering houseplant easily increased from cuttings either in water or in a propagator**

at 21°C (70°F). For rubber plants (*F. elastica*) or fiddle leaf figs (*F. lyrata*), take a leaf with a short piece of stem both above and below and a bud between stem and leaf, and insert in a pot in a propagator at 21°C (70°F)
Notes: Rooting hormone is beneficial

NAME: *GERANIUM* (*PELARGONIUM*)

Type of cutting: Softwood
Timing: Spring to early autumn
Method: Take 8–10cm (3–4in) shoot tip cuttings, trimming below a leaf joint. Remove all leaves except two at the tip and pinch out any flower buds. Place around the edge of a pot, making holes with a dibber, having first moistened the compost. Keep in a light, warm spot but do not cover with plastic or a propagator lid as air circulation is essential to prevent grey mould (*Botrytis*)
Notes: Water the pot from below by standing it in a container of water – keep compost moist but not overwet. Keeping the foliage and stem dry helps to prevent grey mould. Pot cuttings up into individual pots once rooted. Cuttings will also root readily in water in a jar, standing on a windowsill

NAME: *HYPOESTES* (POLKA DOT PLANT)

Type of cutting: Softwood
Timing: Summer or autumn
Method: 3–8cm (1–3in) tip or stem cuttings in propagator at 18°C (65°F), or in a pot covered with a plastic bag
Notes: This plant roots easily from tips, or any part of the stem. Pinch out frequently to keep the plant bushy

NAME: *JUSTICIA* (SHRIMP PLANT)

Type of cutting: Softwood
Timing: Spring to summer
Method: 5–10cm (2–4in) tip cuttings of healthy green shoots. Dip the ends in rooting hormone, insert in a pot in a heated propagator at 18–21°C (65–70°F)
Notes: To produce a bushier-looking plant, place five or six cuttings in a pot and, when rooted, pot up as a single plant into a larger pot. Very easy to root

NAME: *KALANCHOE*

Type of cutting: a) Softwood or b) leaf cutting
Timing: a) Spring or b) summer
Method: a) 5–8cm (2–3in) cuttings from non-flowering shoots in a propagator at 15°C (60°F), allowing the cut surface to dry for 48 hours before inserting in compost. b) Place individual leaf cuttings on the surface of the compost in a pot or tray
Notes: Water cuttings very sparingly. Do not cover with glass or plastic

NAME: *PEPEROMIA*

Type of cutting: Softwood or leaf cutting
Timing: Spring to late summer
Method: For upright and trailing types, 3–5cm (1–2in) cuttings from stem tips. For bushy, stemless types, take an individual whole leaf with stalk. Both will root at a temperature of 18°C (65°F) in a propagator
Notes: Leaf cuttings can be taken for most species of *Peperomia*

NAME: *PILEA* (*P. CADIERI* – ALUMINIUM PLANT)

Type of cutting: Softwood
Timing: Spring to summer
Method: Take 3–8cm (1–3in) long cuttings from tips or any part of stems, inserting in a propagator at 18°C (65°F)
Notes: Place several cuttings evenly in a pot and treat as one plant when rooted, to give you a bushy plant more rapidly

NAME: *PLECTRANTHUS* (SWEDISH IVY)

Type of cutting: Semi-hardwood
Timing: Mid to late summer
Method: Tips of shoots or pieces of stem with a few leaves in slightly heated propagator or warm spot
Notes: Very easy – this trailing plant will also root in water

NAME: *RUELLIA*

Type of cutting: Softwood
Timing: Summer
Method: Take 5–8cm (2–3in) long cuttings from tips of non-flowering shoots, and insert them in a propagator at 23°C (75°F)
Notes: Will also root readily in water

NAME: *SAINTPAULIA* (AFRICAN VIOLET)

Type of cutting: Leaf
Timing: Spring to autumn
Method: Insert individual healthy leaves with stalks in a pot of compost. Root in propagator at 18°C (65°F)
Notes: Individual leaves can also be rooted in water – use a small dark-coloured bottle, fill it with water and place foil over the top. Make a hole for the stalk to fit through to support the leaf

NAME: *SELAGINELLA* (CREEPING MOSS)

Type of cutting: Softwood
Timing: Spring to summer
Method: Use 8cm (3in) lengths of stem as cuttings and root in moist peaty compost in heated propagator at 23°C (75°F)
Notes: A ferny, moss-like plant – keep cuttings shaded and moist, covering container with glass if necessary

ABOVE **African violets can be propagated by leaf cuttings**

NAME: *STEPHANOTIS* (MADAGASCAR JASMINE)

Type of cutting: Semi-hardwood
Timing: Summer
Method: Take short cuttings consisting of a pair of leaves on a piece of stem, dip in rooting hormone and insert in peat or a peat and sand mix. Place in propagator at 21°C (70°F) and keep moist
Notes: Not too difficult with the use of rooting hormone and warm conditions

NAME: *STREPTOCARPUS* (CAPE PRIMROSE)

Type of cutting: Leaf
Timing: Summer
Method: Cut a mature leaf into 8cm (3in) wide horizontal strips, insert the right way up into compost, up to one-third of their depth. Alternatively, cut a leaf in half lengthways, removing the midrib, and insert the two halves into compost, cut side down. Pot up individual plantlets that form once they are growing strongly
Notes: Any pieces of leaf that turn brown or die should be discarded immediately

NAME: *TRADESCANTIA* (WANDERING JEW)

Type of cutting: Softwood
Timing: Spring to summer, though will root at any time
Method: 5–8cm (2–3in) cuttings from tips, in a heated propagator or warm spot
Notes: Very easy – will even root in water. Place several cuttings in one pot and treat as a single plant to achieve a bushy pot-full

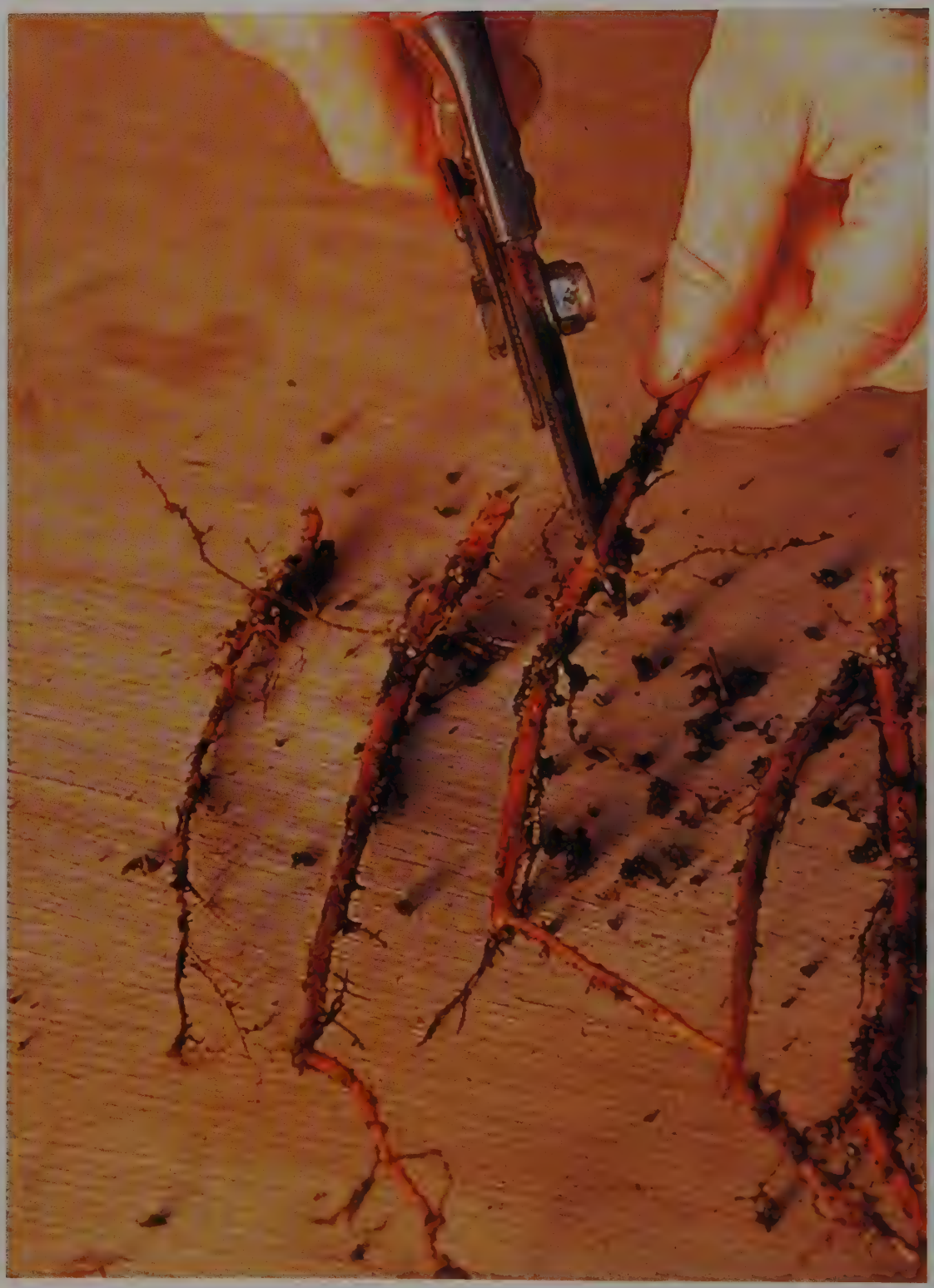
About the authors

Chris and Valerie Wheeler have many years' experience of raising and growing plants, both for their own garden and for the specialist nursery that they owned for over 15 years. They are keen plantsmen, collecting plants for their garden from many sources, and raising more from cuttings.

As well as illustrating their books, Chris contributes pictures to photographic libraries and magazines, and has recently launched a range of greeting cards.

In addition to their writing and photography, they also run their own mail order company specializing in plant labelling.

Chris and Valerie are authors of four other books published by Guild of Master Craftsman Publications – *Sink and Container Gardening using dwarf hardy plants*; *Alpine Gardening*; *Gardening with Hebes*, and the companion to this book: *Success with Seeds*.



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